Mariassunta Giannetti, Mike Burkart and Tore Ellingsen

What you sell is what you lend? Explaining trade credit contracts

Article (Accepted version) (Refereed)

What You Sell Is What You Lend?

Explaining Trade Credit Contracts*

Mariassunta Giannetti

Stockholm School of Economics,

CEPR and ECGI

Mike Burkart

Stockholm School of Economics,

London School of Economics,

CEPR, ECGI and FMG

Tore Ellingsen

Stockholm School of Economics,

and CEPR

*We thank two anonymous referees, Allan Berger, Mike Cooper, Hans Degryse, Paolo Fulghieri (the editor), Ron Masulis, Mitchell Petersen, Greg Udell and seminar participants at the RFS Conference on The Financial Management of Financial Intermediaries (Wharton), the European Finance Association (Zurich), the CEPR Summer Symposium in Financial Markets, the Chicago Fed Bank Structure Conference, the ECB Conference on Corporate Finance and Monetary Policy, The Financial Intermediation Research Society Conference (Shanghai), the University of Utah, Tilburg University, Norwegian School of Management and Business Administration (Bergen), the World Bank, the Bank of Sweden, and the Stockholm School of Economics for their comments. Financial support from the Jan Wallander och Tom Hedelius Foundation (Giannetti), the Riksbankens Jubileumsfond (Burkart and Ellingsen) and the Torsten and Ragnar Söderberg Foundation (Ellingsen) is gratefully acknowledged. Address correspondence to: Mariassunta Giannetti, Stockholm School of Economics, Box 6501, SE—113 83 Stockholm, Sweden; telephone: +46-8-7369607, email: mariassunta.giannetti@hhs.se.

Abstract

We relate trade credit to product characteristics and aspects of bank-firm relationships and document three main empirical regularities. First, the use of trade credit is associated with the nature of the transacted good. In particular, suppliers of differentiated products and services have larger accounts receivable than suppliers of standardized goods and firms buying more services receive cheaper trade credit for longer periods. Second, firms receiving trade credit secure financing from relatively uninformed banks. Third, a majority of the firms in our sample appears to receive trade credit at low cost. Additionally, firms that are more creditworthy and have some buyer market power receive larger early payment discounts.

JEL CLASSIFICATION: G32.

KEYWORDS: Trade credit, contract theory, collateral, moral hazard

Trade credit is an important source of funds for most firms and is considered to be crucial for firms that are running out of bank credit.[1] Previous empirical work has primarily investigated how the borrower's performance and financial health affect the volume of trade credit. We broaden the analysis in two directions. First, we show how trade credit usage is correlated not only with the firm's balance sheet position, but also with the characteristics of the traded product and with the buyer's banking relationships. Second, we analyze both trade credit volumes and contract terms. Overall, while our findings provide some support for existing trade credit theories, they also challenge received wisdom.

Relating trade credit to the nature of the inputs and banking relationships enables us to uncover three novel empirical regularities about trade credit use and practice in the United States.

The first empirical regularity is that *the use of trade credit is associated with the nature of the transacted good.* More specifically, after controlling for debt capacity, suppliers of differentiated products and services have larger accounts receivable than suppliers of standardized goods. Service suppliers also appear to offer cheaper trade credit for longer periods, and do not refuse lending on the basis of the buyer's creditworthiness.

This first set of results demonstrates the empirical relevance of theories that implicitly attribute trade credit to product characteristics. As we argue, these explanations have in common that the products sold on credit are not homogeneous off-the-shelf goods, but each proposes a different economic mechanism. Overall, the empirical evidence lends most support to theories maintaining that suppliers are less concerned about borrower opportunism either because of strong customer relationships or because of the low diversion value of some inputs. Suppliers of services and differentiated products may be hard to replace because they provide unique or highly customized inputs. The consequent high switching costs make buyers reluctant to break up relationships and thus less tempted to default on these suppliers [Cunat (2007)]. Hence, suppliers of services and differentiated products should be more

willing to sell on credit than suppliers of standardized products.

Differentiated products and services are also more difficult or even impossible to divert for unintended purposes. While standardized products command a market price and can be easily sold to many different users, resale revenues may be low for differentiated goods because it may be hard to identify suitable buyers and there is no reference price. Services are virtually impossible to resell. This should contribute to shield suppliers of differentiated goods and services against buyer opportunism [Burkart and Ellingsen (2004)] in the same way as strong relationships with customers do.

Other theories that also implicitly associate trade credit with non-standardized goods find limited support in the data. First, differentiated goods are more often tailored to the needs of particular customers. Original suppliers can redeploy these goods better than other lenders following buyer default because they know the pool of potential alternative buyers or because they can modify the goods more easily to the needs of other customers. Hence, these goods should be sold on credit [Longhofer and Santos (2003); and Frank and Maksimovic (2004)]. This theory appears incapable of accounting for the widespread use of trade credit in the United States, not least because of the suppliers' limited ability to repossess the good. In case of default, U.S. laws allow suppliers to repossess the good only within 10 days since delivery,[2] whereas in our sample the maturity of trade credit typically exceeds 10 days. Additionally, this theory cannot explain why service suppliers are inclined to provide trade credit as services have no collateral value.

Second, differentiated products and services tend to have more quality variation, making buyers more reluctant to pay before having had time to inspect the merchandise or ascertained the quality of services [Smith (1987)].[3] However, we find that suppliers' reputations do not decrease their propensity to offer trade credit.

Finally, other theories propose that suppliers may be concerned with losing crucial customers and

they may be willing to support these customers when they have temporary financial difficulties [Wilner (2000)]. We find no evidence that buyers of services and differentiated products receive more assistance. However, the data support the notion that suppliers sustain firms with financial problems, thus confirming that trading relationships are important to understand trade credit.

The second empirical regularity is that *firms receiving trade credit secure financing from relatively uninformed banks.* After controlling for firm creditworthiness and outstanding financial loans, firms that use trade credit tend to borrow from a larger number of banks, utilize more distant banks, and have shorter relationships with their banks. Additionally, these firms are offered better deals from banks, in particular lower fees for their credit lines.

Firms borrowing from numerous and distant banks for short periods are generally considered to have arm's length relations with their lenders who gather only limited information about their businesses [e.g., Von Thadden (1995) and Degryse and Ongena (2004)]. Hence, it appears that firms that are being offered trade credit can secure funding from less informed financial intermediaries. The positive relationship between uninformed bank credit and trade credit is consistent with Biais and Gollier's (1997) theoretical result that the extension of trade credit reveals favorable information to other lenders, thereby increasing their willingness to lend. While we cannot exclude that more public information is available about these firms, our finding reveals that suppliers do not enjoy an informational monopoly. In either case, suppliers have no persistent informational advantage and other suppliers should be willing to do business with the firm as easily as less informed banks. Thus, trading relationships are more likely to arise because of high switching costs and not because the current supplier's private information about the customer deters new suppliers, as is believed to be the case for bank-firm relationships [Sharpe (1990); and Rajan (1992)]. In addition, this finding challenges the notion that firms using trade credit are unable to access bank credit.

The third empirical regularity is that *a majority of our sample firms receives trade credit at low cost.* Additionally, large firms and firms with many suppliers are offered more trade credit with longer maturity and larger early payment discounts.

Only a minority of firms in our sample report that their main supplier offers early payment discounts. To the extent that foregone discounts are the predominant cost of trade credit, as suggested by previous literature [e.g., Petersen and Rajan (1994)], most trade credit appears cheaper than bank credit. In principle, suppliers could implicitly charge for trade credit by raising input prices. While we are unable to directly control for this possibility, we find evidence of the contrary: Within an industry, firms with large accounts payable have a lower cost of inputs. Hence, this finding goes against the common view that trade credit is primarily a last funding resort for firms that are running out of bank credit.

We also find that large firms receive more discounts. Since large firms are usually less risky, discounts are unlikely to capture a risk premium. It seems more plausible that the discounts reflect a price reduction offered to customers that are able to pay early. Such an interpretation is also consistent with the finding that firms with many suppliers, which arguably have greater bargaining power, receive larger discounts. Large firms and especially firms with many suppliers also receive more trade credit for longer periods. This again suggests that buyer market power affects the availability of trade credit. Existing theories fail to explain why suppliers provide trade credit to customers with bargaining power instead of offering (larger) price reductions.

Our work is related to several previous studies. Following Elliehausen and Wolken (1993) and Petersen and Rajan (1997), we use detailed firm-level survey data from the National Survey of Small Businesses Finances (NSSBF). We add to their work by exploiting industry variation in trade credit to discriminate among different theories. In addition, we analyze both *how much* trade credit is offered – as they do – and *how* trade credit is offered. Using a different data set, Ng, Smith, and Smith (1999) study

variation in trade credit contract terms, focussing on how supplier characteristics affect the decision to offer early payment discounts. Bringing these two approaches together, our paper attempts to analyze the complete trade credit contract. More importantly, we introduce theoretically motivated measures of product characteristics to explain the broad set of contract characteristics and thereby evaluate the empirical relevance of different theories.

McMillan and Woodruff (1999), Johnson, McMillan, and Woodruff (2002), and Uchida, Udell, and Watanabe (2007) document that in emerging markets as well as in Japan longer duration of trading relationships is often associated with more trade credit. Complementing these findings, our study indicates that the extent to which relationships may help to explain the suppliers' willingness to extend credit depends crucially on the type of goods that they provide.

Some recent papers investigate the relative importance of trade credit across countries and over time. Demirguc-Kunt and Maksimovic (2002) and Fisman and Love (2003) document that firms in countries with weak legal systems rely relatively more on trade credit. Similarly, increased reliance on trade credit during recessions [Nilsen (2002)] suggests that trade credit helps mitigating agency problems.

Our work is also related to the growing literature that studies the determinants of contract terms in different contexts [e.g., Berger and Udell (1995); and Kaplan and Strömberg (2003)]. Besides studying the contract terms that suppliers offer, the data also allow us to analyze how contract terms affect actual borrower behavior.

The remainder of the paper is organized as follows. Section 1 provides the theoretical background and derives the hypotheses. Section 2 describes the data and provides summary statistics. Sections 3, 4 and 5 report our results on trade credit volume, contract terms and usage. Section 6 concludes.

1. Theories

In this section, we review the implications of trade credit theories and explain to what extent systematic differences in the nature of the products transacted in different industries can help to shed light on their empirical relevance. Among the various theories, we focus almost exclusively on financial and contract theoretical explanations,[4] while attempting to control in the empirical analysis for other potential determinants of trade credit. It is beyond the scope of our paper to test theories based on imperfect competition, as full tests of these theories would require observing transacted quantities and prices.

Besides the amount of input sold on credit, a supplier's trade credit decision includes other terms such as due date and interest rate. These terms determine the cost of credit and its maturity, but may also reflect the reason(s) why a supplier is willing to sell on credit. In what follows, we divide the discussion of the theoretical background into two parts. We begin by reviewing the various explanations for (the existence of) trade credit. We then describe the various contract terms and discuss the implications of financial contracting theories for these terms.

1.1 Existence of trade credit

Following most theoretical papers, we discuss the trade credit decision from the supplier's perspective. To this end, we present a simple formal framework to explore why a supplier may be more willing than a bank to fund the input purchase of a customer. In so doing, we identify the supplier and customer characteristics that are predicted to explain variation in trade credit. We also want to point out that while our simple framework is static, the underlying logic sometimes relies on dynamic considerations.

Consider a penniless entrepreneur who wants to purchase inputs with a market value (price) of L. For simplicity, suppose that the entrepreneur borrows either from a bank or a supplier, but not from

both. Let L_i denote lender i's opportunity cost of extending the loan. The index denotes whether the lender is a bank (B) or a supplier (S). For a competitive bank with constant marginal cost of funds r, the cost is $L_B = (1 + r)L$. Let D_i denote the repayment obligation associated with the loan. Initially, we want to compare the willingness of banks and suppliers to lend, leaving aside the issue of optimal contracting. We therefore fix the repayment period and set $D_B = D_S = D$. Let p_i denote the true probability that the borrower repays the loan, and let $A_i(p_i)$ denote lender i's assessment of the probability. In case the borrower defaults, the lender gets some collateral C_i. Hence, lender i's expected profitability of granting the entrepreneur the loan L can be written as:

$$E[\pi_i] = A_i(p_i)D + (1 - A_i(p_i))C_i - L_i. \tag{1}$$

This expected profitability formula allows us to distinguish four reasons why suppliers may be more willing than banks to fund input purchases:

1. *Collateral liquidation; $C_S > C_B$.* In defaults, creditors are entitled to seize the firm's inputs and other assets.[5] A repossessed input may be worth more to the supplier than to the bank precisely because the supplier is in the business of selling this good [Frank and Maksimovic (1998); and Longhofer and Santos (2003)]. This comparative advantage is more pronounced for differentiated goods because these are often tailored to the needs of few customers.[6] Knowing their customer base and being able to reverse product specialization more cheaply, suppliers can re-sell the good at higher price (*collateral hypothesis*). In contrast, sellers of standardized products and services do not have a repossession advantage: Standardized products have a reference price that any lender should be able to obtain, whereas services have no liquidation value.

2. *Moral hazard; $p_S > p_B$.* A supplier may be willing to extend (more) credit because the entre-

preneur is more likely to repay him than to repay the bank. Cunat (2007) argues that if the supplier is vital for the entrepreneur's future business due to the lack of alternative producers, the entrepreneur has a stronger incentive to strategically default on the bank than on the supplier (*switching cost hypothesis*). Since their goods are tailored to the needs of the buyer, suppliers of differentiated goods and services are more costly to replace. Indeed, using survey evidence, Johnson, McMillan, and Woodruff (2002) show that firms are more likely to switch suppliers when they buy standardized off-the-shelf goods. When breaking up the relationships is costly, customers are less tempted to default. Hence, suppliers of differentiated products and services should be more inclined to extend trade credit. In addition, suppliers may be less susceptible to the risk of strategic default than banks because inputs are less liquid and thus less easily diverted than cash [Burkart and Ellingsen (2004)]. Accordingly, defaults related to the diversion of corporate resources are less likely if the supplier grants the loan (*diversion hypothesis*). Survey evidence shows that credit fraud is a concern for most firms, especially when dealing with new potential customers, as diversion is most often perpetrated by fictitious entrepreneurs. However, suppliers of services, such as energy and transportation, and producers of differentiated goods, such as technology, are significantly less likely to be subject to this type of fraud than suppliers of standardized goods, such as basic materials, and retailers and wholesalers [Credit Research Foundation (2005)]. Since differentiated products and (to a larger extent) services are harder to divert than standardized products, they should be associated with more trade credit. Conversely, retailers and wholesalers should supply less trade credit, as they trade highly liquid final products.

3. *Informational advantage;* $A_S > A_B$. Although banks gather information to assess the creditworthiness of potential borrowers, a supplier may sometimes have access to superior information [Biais

and Gollier (1997); and Jain (2001)]. For instance, an informational advantage may arise because the supplier and the entrepreneur operate in closely related lines of business. In such situations, banks are reluctant to be exclusive lenders, because they face a lemon problem and would end up with an adverse selection of borrowers. Banks may become more inclined to lend if they observe that suppliers extend credit (*information advantage hypothesis*). Even though there exists no formal model, it is possible that suppliers that entertain long-term relationships with firms accumulate private information about their customers similarly to banks. In this case, they should be willing to lend more than less informed financial intermediaries and suppliers. Existing empirical evidence shows that trade credit volume increases over the course of the relationship, with the increase being concentrated in the first year [McMillan and Woodruff (1999); and Johnson, McMillan, and Woodruff (2002)]. This suggests that suppliers learn most about the customers especially during the first few months, in particular whether a customer is a fictitious entrepreneur. This is the most common concern of suppliers of highly liquid products [Credit Research Foundation (2005)].

4. *Imperfect competition;* $L_S < L_B$. The supplier's opportunity cost can sometimes be considerably smaller than that of the bank, or equivalently, the forgone profits from denying a loan can be substantially higher. When an entrepreneur has exhausted his bank credit limit, the supplier may find it profitable to make additional sales on credit, as pointed out by Nadiri (1969). Complete versions of this argument must also explain why the supplier does not simply selectively lower the price to credit-constrained customers. After all, it is the additional sale that generates the supplier's profit, not the credit transaction as such. Smith (1987) and Brennan, Maksimovic, and Zechner (1988) both introduce asymmetric information about customer characteristics to

explain why suppliers offer trade credit and early payment discounts. Customers reveal their credit needs by choosing whether to take advantage of the early payment discounts (*price discrimination hypothesis*). Trade credit may also be the result of market power on the customer side. Wilner (2000) argues that a dependent supplier may help a customer with temporary financial problems because his own prospects are positively related to those of the customer.

Our simple framework fails to accommodate some trade credit theories, notably explanations based on product quality considerations [Smith (1987); Lee and Stowe (1993); and Long, Malitz, and Ravid (1993)]. The supplier may have superior information about the input's true market value L. To alleviate the customer's fears of being cheated, the supplier may thus grant the customer an inspection period before demanding payment. That is, offering trade credit is a way to guarantee product quality by enabling the buyer to return inferior goods without paying (*quality guarantee hypothesis*). As differentiated products and services are less readily checked for quality than standardized goods, implicit guarantees through trade credit should be more frequently offered for differentiated goods and services. Relatedly, offering trade credit can mitigate lender moral hazard. If the quality of the supplier's input directly affects the customer's commercial success, bundling input sale and credit increases the supplier's incentive to provide high quality, and thereby the customer's probability of success is higher than if the bank is the creditor.

1.2 Contract terms

Since maturity and cost of credit are integral parts of a supplier's trade credit decision, observed contract terms can help to evaluate the empirical relevance of different theories. However, many trade credit models offer – at best – predictions for a subset of contract terms. Therefore, we resort to generic lending models that address similar agency problems or directly apply insights from the financial contracting

literature. Before discussing the emerging implications for the contract terms, we describe the various dimensions of trade credit contracts.

Suppose trade credit is given at date t_0. The associated repayment D may, in principle, be any function of the repayment date $t > t_0$. However, in practice, trade credit contracts can almost always be described as a step function:

$$D(t) = \begin{cases} D_1 & \text{if} \quad t \leq t_1; \\ D_2 & \text{if} \quad t \in (t_1, t_2], \end{cases} \tag{2}$$

where t_1 is the *discount date* and t_2 is the *due date*. The interval $(t_0, t_1]$ is the *discount period* and the interval $(t_0, t_2]$ is the *payment period*. When $t_1 = t_2$, there is no early payment discount, and when $t_1 = t_0$, there is a cash discount.[7] It is conventional that $D_2 = L$ and, if an early payment discount is offered, that $D_1 < L$. Thus, the trade credit interest is positive only once the discount period has elapsed. Furthermore, the buyer has little incentive to repay prior to the due date (end of the discount period) as the repayment remains D_2 (D_1) over the entire period $(t_1, t_2]$ ($(0, t_1]$).

The cost of trade credit is commonly computed assuming repayment at t_2 and considering only firms that have been offered early payment discounts. In this case, the annualized trade credit interest rate for the period $t_2 - t_1$, call it r_A, is given by:

$$r_A = \left(1 + \frac{D_2 - D_1}{D_1}\right)^{\frac{365}{(t_2 - t_1)}} - 1. \tag{3}$$

The cost of forgoing early payment discounts often implies a very high annualized interest rate.[8] The actual cost is on average lower both because some firms are not offered early payment discounts and because trade credit has zero interest during the discount period.

The interest rate on trade credit, like on any financial loan, ought to depend on the perceived riskiness of the borrowers. The riskiness is affected by the borrower's creditworthiness and also by the seller's ability to ease financial market imperfections. In competitive markets, suppliers that have superior information or that are able to obtain a higher liquidation value should be willing to offer better terms than other lenders. Similarly, suppliers that are able to mitigate borrower moral hazard should offer cheaper loans.[9] Hence, product characteristics should be related to the cost of trade credit in a similar fashion as is the willingness to sell on credit in the first place.[10]

To the extent that firms have some financial slack or unused credit facilities enabling them to take advantage of discount offers, discounts are essentially price reductions. In non-competitive markets, early payment discounts may be a way to price discriminate across customers with different propensity to pay early and are therefore expected to be increasing in the seller's market power.

A high interest rate on trade credit may also reflect that the seller has high opportunity cost of funds. If there are buyers whose financial condition is good relative to that of the seller, these buyers should be induced to pay early using a cash discount. In this way, the contract avoids the inefficiency associated with a loan from a credit-constrained seller to an unconstrained buyer. However, in a competitive market, sellers' desire for early repayment can justify only relatively small early payment discounts. The reason is that receivables are usually quite easy for the seller to fund, and therefore do not crowd out other investments to a great extent.[11]

Only some of the trade credit theories have direct implications for the determination of maturity dates. The quality guarantee hypothesis ties maturity to the time it takes to inspect the good. The collateral liquidation theory and the diversion theory tie maturity to the transformation time of the input. Once the input has been transformed or sold, the supplier loses his comparative advantage relative to other lenders. The supplier's ability to repossess the good, crucial for the collateral liquidation theory,

also depends on legal rules. In the U.S., the Uniform Commercial Code gives the seller the right to reclaim the good sold to an insolvent buyer within ten days from the delivery [Garvin (1996)]. Since suppliers' potential liquidation advantage vanishes after ten days, the collateral hypothesis implies that the maturity of trade credit should not be longer than that.

Finally, financial contracting theories emphasize that short(er) maturity is a means for lenders to obtain control, thereby mitigating borrower moral hazard [e.g., Aghion and Bolton (1992)]. Accordingly, suppliers that have a comparative advantage in controlling borrower opportunism should offer longer payment and/or discount periods. Based on the discussion in the previous subsection, we thus expect that suppliers of differentiated products and services offer trade credit with longer maturity.

2. Data and Descriptive Statistics

2.1 Data sources

Our main data source is the 1998 National Survey of Small Business Finances (NSSBF), which was conducted in 1999-2001 by the Board of Governors of the Federal Reserves System and the U.S. Small Business Administration. The NSSBF provides a nationally representative sample of small non-financial, non-farm U.S. businesses with less than 500 employees that were in operation as of December 1998.

The NSSBF contains firm-level cross-sectional information that goes well beyond balance sheet items and is regarded as the most detailed source of data available on small business finance [Wolken (1998)]. Accordingly, it is frequently used to study the use and extension of trade credit [Elliehausen and Wolken (1993); and Petersen and Rajan (1997)], the role of lending relationships and credit availability to small businesses [Petersen and Rajan (1994, 1995); Berger and Udell (1995); and Berger, Miller, Petersen, Rajan, and Stein (2005)]. From the NSSBF we obtain information on accounts payable, accounts

receivable, the purchases financed by trade credit and associated contract terms.

We match the NSSBF data with industry-specific information. From the NSSBF we can identify industries at the two-digit SIC level. While this is obviously a coarse measure, we are not aware of any other data source that includes detailed information on trade credit use and a finer industry disaggregation. We run a robustness check using the 2001 Compustat data, which allows us to identify industries at the four-digit SIC level. Due to data limitations, this robustness test can be performed only for the accounts receivable. In the rest of the analysis, the coarse two-digit industry classification is bound to lead to measurement errors, thereby biasing our estimates against finding any results. Consequently, our positive results can be downward-biased by measurement errors, while our negative results should be interpreted more cautiously as the lack of statistical significance may reflect the fact that our proxies are too noisy.

The nature of the product is the main characteristic along which we classify each industry. We follow the product classification of Rauch (1999), who distinguishes between *standardized goods* (goods with a clear reference price listed in trade publications), and *differentiated goods* (goods with multidimensional characteristics and therefore highly heterogeneous prices). The latter are thought as more difficult to liquidate and more adapted to the needs of specific buyers. Remaining industries are classified as *services*. In the Appendix we provide the complete list assigning each industry to one of the three product classes.

Each product category includes rather disparate industries. For instance, accountants and food stores are both classified as services. This heterogeneity should limit concerns that our product classification captures omitted industry characteristics, such as growth opportunities or differences in the relation between buyers and sellers.[12]

With this product classification we can straightforwardly investigate whether the amount of trade

credit that a firm *extends* depends on the nature of the product. To analyze the determinants of the trade credit offered to a given firm, we need to identify the nature of the various inputs that the firm purchases. We construct proxies for the input characteristics with the help of the input-output matrices from the U.S. Bureau of Economic Analysis. These matrices provide information on the amount of different inputs required to produce one dollar of industry output. Using the SIC code, we combine the input-output matrices with our product classification, obtaining industry-specific measures for the average use of inputs with different characteristics. That is, we construct proxies for the relative amount of standardized products, differentiated products, and services that a firm uses as inputs. Importantly, input-output matrices also allow us to identify the components of a purchase. For instance, if a firm purchases a car, the latter is classified as input from the automotive industry, while the act of selling the car is recorded as a service (retail) in the input-output matrices.

We control for industry differences in market structure, which could be correlated with our proxies for the nature of the good. To capture the extent of competition in the market in which a given firm –whether relatively large or small– operates, we use the market share of the eight largest firms, constructed by Pryor (2001). By combining the input-output matrices with Pryor's concentration indices in a similar way as above, we construct measures of market concentration in the input markets.

Finally, for information on contract terms from the suppliers' viewpoint, we rely on Ng, Smith, and Smith (1999).[13] They document the most common practices in different industries, notably the length of the payment period and the provision of early payment discounts.

2.2 Sample firms

The 1998 NSSBF covers 3,561 firms. As the available information is not complete for all firms, our final sample includes 3,489 firms. Additionally, we lose some observations when matching sample firms with

product classification and input information. For this reason, the number of observations in different regressions varies according to the chosen specifications.

Table 1 summarizes the main characteristics of our sample. Panel A shows that firms are relatively young and small. They are, on average, younger than 15 years and have less than US$ 4 million in sales and less than US$ 2 million in assets. A majority of firms in our sample supply services. Among these, slightly more than one-third are wholesalers and retailers.[14]

[Insert Table 1 here]

Even though the sample firms are relatively small, there is considerable heterogeneity in size. Firms in the lowest decile have less than US$ 3,600 in assets while those in the highest decile have more than US$ 3.2 million in assets. The differences in firm size have a material impact on the extension of and access to trade credit as our subsequent analysis shows. Using the 1993 NSSBF data, Berger, Miller, Petersen, Rajan, and Stein (2005) document that differences in size (and accounting records) also affect the nature of the bank-firm relationship and the availability of bank credit.

A firm's willingness to extend trade credit, and its ability to obtain credit from suppliers depend on its need for funds and access to other financing sources. Panel A of Table 1 also reports a number of firm characteristics capturing access to funds and proxies for access to (bank) credit. In addition, we provide information on the firms' relationship with their bank(s).

Panel B of Table 1 presents the industry-specific proxies that we have constructed. It suggests that firms producing standardized products operate in more concentrated industries and also use inputs from relatively more concentrated industries. We present also our proxies for the average use of standardized, differentiated goods and services in different industries. While services are highly heterogeneous, the services most commonly used by our sample firms are electric utilities; gas production and distribution;

transportation; communications, except radio and TV; automotive repair and services; and insurance. All these services have a relatively low resale value and are difficult to replace either because of technology reasons (as for utilities) or because they are tailored to the needs of the customer (as for automotive repairs).

The input-output matrices are also useful because they include information on how much firms in a given industry sell (buy) to (from) other firms in the same industry. The intra-industry trade captures sales to customers and purchases from suppliers in related business lines. Arguably, firms know more about other firms in related business lines. Hence, we use intra-industry trade as a proxy for the informational advantage of suppliers.

2.3 Trade credit contracts

Since trade credit is the outcome of a bilateral relationship, we would ideally want to match suppliers with their customers. As the data do not permit such a matching procedure, we study the roles of supplier characteristics and customer characteristics separately. That is, we view the sample firms first as suppliers and analyze trade credit from the lenders' perspective. Thereafter, we consider the very same firms in their role as customers and investigate trade credit from the borrowers' perspective. We have information on the contract terms for purchases but not for sales, so we can examine the contract terms only from the customers' perspective.

2.3.1 *Suppliers' perspective.*

A supplier's willingness to extend credit corresponds to the amount of sales for which he does not ask payment at or before delivery. Since we do not observe how much each firm sells on account, we use receivables as a proxy for how much suppliers are willing to lend.[15] The shortcoming of this proxy is that

receivables are simultaneously determined by the firm's willingness to sell on credit and by its customers' demand for trade credit. Relatively small receivables may be a manifestation of a low willingness to sell on credit or of a low demand for trade credit.

Due to this ambiguity, our findings may underestimate the importance of industry-specific characteristics for the willingness to extend trade credit. If firms in some industries are more willing to lend, banks may also be willing to do so. Having access to more bank credit, these firms may rely less on trade credit financing, and their suppliers may have less receivables.

Another source of bias stems from the fact that the demand for trade credit facing a firm is affected by a variety of customer characteristics that we do not observe. If customers with different characteristics were equally distributed across suppliers, each supplier's receivables would be equally affected by the firm-specific component of trade credit demand. However, it seems more plausible that less financially constrained and more reputable buyers match with comparable suppliers. Hence, our proxy may underestimate the importance of trade credit.

Panel C of Table 1 shows that firms in industries that produce different types of goods also differ in the extent to which they provide trade credit. Thus, it appears that our product classification in standardized, differentiated, and services captures relevant differences. For instance, service firms have a lower accounts receivable to sales ratio. Provided that these variations persist after controlling for firm characteristics – which may not be the case as firms in the service industries appear systematically smaller – this would indicate that the collateral value of the product matters for the firms' willingness to sell on credit. Closer scrutiny of the data suggests that service firms have very different attitudes in providing trade credit. In particular, firms providing communication services or transportation have a receivables to sales ratio that is comparable to the average of firms supplying differentiate products. The ratio is much lower for retailers and wholesalers.

Panel C of Table 1 also includes the terms of credit offered by suppliers in different industries, taken from Ng, Smith, and Smith (1999). Ng, Smith, and Smith report wide variations across industries in trade credit terms offered but little variations within industries: Firms in some industries tend not to offer early payment discounts, whereas firms in other industries offer a choice between net terms and discounts. Also the quoted discount terms vary little within industries but considerably across industries where discounts are common. To the extent that these findings generalize to our sample (the rest of our analysis casts some doubt on this), we analyze how well the nature of the product captures the variation in the contract terms offered by suppliers.

Panel C of Table 1 shows that on average providers of differentiated products extend trade credit for thirty days. This is well beyond the ten days interval in which they are able to repossess the good and casts doubts on the hypothesis that the advantage of these suppliers in extending credit derives from being able to redeploy the good more efficiently. Moreover, service firms appear to grant their customers an almost equally long payment period as producers of differentiated goods and are less likely to offer discounts. Contrary to the descriptive statistics on receivables, this suggests that service suppliers may be more inclined to provide trade credit than suppliers in other industries. In general, it illustrates that analyzing contract terms as well as volume allows for a more complete interpretation of the evidence.

2.3.2 *Buyers' perspective*

Firms participating in the NSSBF survey not only report their receivables but are also asked the percentage of purchases offered on account. Like Petersen and Rajan (1997), we use the percentage of input purchases on account to identify the quantity of trade credit offered to a firm. As there is usually some interest-free period, a firm's purchases on account are indeed largely supply driven. Only when a discount is offered and the discount date is reached, do supply effects mingle with demand effects. The

distribution of purchases on account indicates large heterogeneity in the supply of trade credit to our sample firms. For instance, more than 35% of all firms report that they never purchase on account, whereas almost 20% make all their purchases on account.

Since purchases on account is a flow variable, it is still not a clean measure of the supply of trade credit, unless it is linked with the purchasing frequency and the repayment period. The NSSBF survey only contains information on the percentage of inputs that firms purchase on account during the entire year of 1998, but not on the purchasing or repayment patterns. We mitigate this problem by incorporating information on *how* trade credit is offered. The maturity and the cost of using trade credit affect the frequency of purchases and repayment, and therefore the extent to which purchases on account translates into actual trade credit supply.

Panel D of Table 1 reveals that the amount of trade credit offered to our sample firms differs across industries. Service firms in particular seem to receive less trade credit. In addition, trade credit appears pervasive even in the early stages of the life of a firm, when relationships with suppliers are not yet established: Firms younger than one year already make 30% of their purchases on account. This percentage increases until the firm becomes five years old and remains stable thereafter.

Firms also report the terms at which their suppliers offer trade credit. This enables us to study the terms of trade credit from the buyer's point of view. The collected information includes the percentage of suppliers offering cash discounts, and, for the most important supplier, the due date, the size of the early payment discount, the duration of the discount period and the size of the late payment penalty. Additionally, firms are asked whether they used cash discounts and whether they paid after the due date.

When the seller offers net terms only, trade credit duration is simply the time between the billing date and the due date. If the seller offers a discount, the discount period is a measure of trade credit

duration as well.

The NSSBF survey includes data on due dates only for the most important supplier of each firm. Moreover, this information is not reported in terms of number of days but in terms of 11 different intervals, ranging from immediate payment, payment between one and seven days, ..., up to payment more than 90 days after delivery. Accordingly, due dates in our analysis do not refer to the actual number of days but to the mean of each interval in which the bill of the most important supplier is due.

Panel D of Table 1 shows that, on average, trade credit is due in about 25 days, with buyers of standardized inputs being granted longer payment periods. More than 70% of the firms report the due dates by their most important supplier in the interval including 30 days. This is consistent with earlier studies documenting the wide spread use of a 30 days payment period. Among the remaining firms, shorter payment periods are prevalent, though periods of more than two months also occur.

Panel D of Table 1 also shows that firms making purchases on account are on average offered a discount by 20% of the suppliers. Only 5% of these firms receive discounts by all their suppliers. Even more strikingly, 50% of the most important suppliers do not offer discounts. This variation may be caused by differences in the composition of inputs employed: Some firms may use more inputs from industries where discounts are standard practice, others may purchase more inputs that are only sold on net terms. Alternatively, the variation may be due to individual buyer characteristics. In the empirical analysis, we investigate the latter hypothesis.

We also observe the discount period that the most important supplier offers to our sample firms. Among the firms whose most important supplier offers an early payment discount, the average discount period is 14 days. A vast majority (80%) obtains a discount when paying within ten days. This is again consistent with the findings of Ng, Smith, and Smith (1999). Like the other contract terms, the length of the discount period, however, is not an entirely rigid parameter. For the remaining firms, longer

discount periods are more common than shorter.

For the subsample of firms offered discounts from their most important supplier, the most common discount term practice is 2% discount for payment within ten days, as noted in previous studies [Petersen and Rajan (1995); and Ng, Smith, and Smith (1998)]. However, 10% of firms receive discounts of less that 1% or more than 5%. We consider to what extent these differences may be related to longer maturity by taking the ratio of the discount size to the difference between the due date and the last day of the discount period to obtain the discount per day. Using this correction, we find even larger variation in discount sizes.

To compare the cost of trade credit with the cost of other sources of funding, we calculate a proxy for the annualized cost of trade credit similarly to Petersen and Rajan (1994), but take into account that trade credit typically has some interest-free period (discount period). Because of this correction, we find that the average annualized trade credit interest rate is 28% for firms receiving early payment discounts from their most important supplier. A quarter of the firms can borrow from suppliers at an interest rate that is less than 13% and not significantly larger than the bank interest rate for our sample firms. By contrast, another quarter of firms indeed borrows from suppliers at a rate above 40%. If we include in the computation firms that are not offered discounts, the median firm receives trade credit at zero cost.

These estimates are subject to the qualification that the cost of trade credit could be embedded in the price of the good. Like other empirical studies, we do not observe input prices. However, if a supplier offers the buyer to pay either a lower price immediately or a higher price later, this should appear in the survey as an early payment discount with no discount period. Hence, even when trade credit comes with no discounts, its cost may not be concealed by the price of the good. Moreover, in the empirical analysis, we show that, within an industry, firms with higher payables do not pay more

for their inputs.

These findings challenge the common wisdom that trade credit is necessarily an expensive source of finance and are consistent with growing anecdotal evidence that attributes the good performance of successful companies to cheap trade credit.[16] More relevant for small firms, the National Association of Credit Management estimates that the effective rates behind early payment discounts can be as low as 3% [Miwa and Ramseyer (2002)].

In order to enforce their due dates, suppliers may impose a penalty for late payment even if they do not allow purchases on account: More than seventy% of the sample firms face penalties for late payment. Among the firms that are allowed to make purchases on account, only 50% face penalties for late payment. Penalties are typically around 1% of the purchasing price.

Panel E of Table 1 shows that the correlations between the various contract terms offered are low and only a few are statistically significant at the 10% level. Rather intuitively, purchases on account are positively related to the number of suppliers offering to sell on account and the percentage of suppliers offering a discount. Similarly, firms are offered to make more purchases on account when the late payment penalty is lower; both features indicate that the supplier is relatively unconcerned about default. Discount period and due date, the two measures of trade credit duration, are positively related as are the different measures of the effective price, such as the size of the discount and the late payment penalty. Furthermore, the maturity of trade credit is positively related to the effective price measures, reflecting the suppliers' higher opportunity cost of lending for longer periods.

Notwithstanding the low correlation, the various contract characteristics are clearly determined simultaneously at the time the credit is offered to a firm. We lack, however, comprehensive theories offering predictions on how the different contract characteristics, such as volume and late payment penalty or maturity, are interrelated (e.g., whether the volume determines the late payment penalty or

vice versa). Therefore, we simply consider reduced form equations in which contract terms and volume are posited to depend on firm and industry characteristics.[17]

2.3.3 *The use of trade credit.*

A firm's outstanding debt to its suppliers depends on the extent to which suppliers are willing to sell on account and on the average effective payment period. The effective payment period depends in turn both on the terms of the suppliers' contract and on the firm's behavior. Contracts without early payment discounts and with long payment periods induce larger payables, but payables can also be large due to the firm's decisions to forego discounts and to pay after the due date.

Panel F of Table 1 shows that more than half of our sample firms use trade credit. Interestingly, the actual maturity of trade credit, proxied by the ratio of payables to the per day cost of doing business (payables' turnover), is longer than the contractual maturity.[18] This is consistent with the fact that almost half of the sample firms paid at least one of their bills after the due date, and that the fraction of input purchases paid late exceeds 10%. The use of discounts is negatively related to the use of trade credit as a source of funding, suggesting that some contractual provisions affect behavior.

In the empirical analysis, we relate payables and repayment behavior to firm characteristics that affect the demand for trade credit and to the contract terms offered by the suppliers.

3. Results on Trade Credit Volume

We measure the volume of trade credit from the supplier's and the buyer's side, respectively, by using (1) the ratio of receivables to sales (a proxy for the suppliers' willingness to extend trade credit to all customers), and (2) the percentage of purchases on account by a given firm (capturing the supply of trade credit to a given firm from all suppliers). We relate our two proxies for the volume of trade credit

to the nature of the transacted product in different industries. In the case of receivables, the output is classified as standardized good, differentiated good, or services. In the case of purchases on account, the nature of the inputs is defined by the relative amounts of standardized goods, differentiated goods, and services that firms in these industries on average employ in production. We control for proxies of firms' access to internal and external funds, creditworthiness, and industrial structure.[19]

Panels A and B of Table 2 present our results for the ratio of accounts receivable to sales and the purchases on account respectively. In both cases, the first column presents the regression including industry fixed effects for comparison with the following columns where we include our industry-specific variables instead of industry fixed effects.[20] In all cases, errors are clustered at the industry level, since a large part of the evidence derives from cross-industry differences. In what follows, we present the main findings sorted by the different theories.

[Insert Table 2 here]

3.1 Collateral hypothesis

Panel A of Table 2 (Column 2) shows that firms producing differentiated products are more willing to supply trade credit as they have a higher ratio of receivables to sales. This is unlikely to depend on a greater availability of funds in these industries as we control for a number of variables that capture access to internal and external funds. Additionally, the result is robust to using the 2001 Compustat data (Column 3), which allow for the finer four-digit SIC disaggregation and include much larger firms (with an average total assets of over US$ 5 million). The consistency of the results for the receivables across the two data sets increases our confidence that the subsequent findings are unlikely to be driven by the coarse two-digit SIC classification.

Panel B of Table 2 confirms this finding from the buyer's point of view. Firms that buy a larger

fraction of differentiated products make more purchases on account (Column 2). Additionally, firms buying a larger fraction of differentiated products are more likely to be offered trade credit (Column 4). These results are again unlikely to be driven by systematic industry differences in firm creditworthiness as we control for a large range of firm characteristics. Since differentiated goods are worth more in the hands of the original supplier, this evidence is consonant with the collateral liquidation hypothesis.

However, other findings are difficult to reconcile with the collateral hypothesis. First, we find that service suppliers are equally likely as suppliers of differentiated products to offer trade credit, once we control for debt capacity. (In the descriptive statistics, this relationship was obscured by the fact that service firms are on average smaller and thus have a lower debt capacity.[21]) This finding cannot be explained by the collateral hypothesis because services have no collateral value. Second, the collateral hypothesis implies that suppliers of differentiated inputs should lend relatively more when the probability of having to redeploy the input is higher. Yet, Panel B (Column 3) shows that riskier firms do not receive more trade credit when they buy a larger proportion of differentiated products. Hence, differentiated product suppliers do not appear more inclined to lend to firms with a high likelihood of default than other suppliers. Quite to the contrary, the estimates in Panel B (Column 7) suggests that firms buying more differentiated products are more likely to be denied credit because of suppliers' concerns about their repayment ability. Finally, companies that have established a lien on their assets in order to obtain bank loans appear to be offered more trade credit. In this case, suppliers are more likely to be junior to other creditors even during the first ten days after delivery. Hence, their comparative advantage in redeploying the good becomes futile, and they should lend less not more. These findings together with the previously mentioned limited ability of suppliers to repossess the good cast doubts on the relevance of the collateral hypothesis.

3.2 Moral hazard hypotheses

An alternative reason why suppliers of differentiated goods and services offer more trade credit is their comparative advantage in mitigating buyer moral hazard. The source of this advantage may be either the buyer's cost of switching suppliers or the difficulty of diverting inputs.

Theories based on borrower moral hazard can explain why both suppliers of differentiated products and of services are inclined to offer more trade credit, as found in Panel A of Table 2. Defaulting on these suppliers may entail large costs, as the suppliers are difficult to replace, or low benefits, as the inputs have low diversion value. Borrower moral hazard can also explain the considerably lower receivables in retail and wholesale, as these industries trade highly liquid final products, which are easy to divert.

Panel B of Table 2, however, provides conflicting evidence. Firms that buy relatively more services receive *less* trade credit from their suppliers (Columns 2 and 3) and are also less likely to use trade credit at all (Column 4). The low supply of trade credit to firms buying more services may be reconciled with the ample lending by service suppliers if the latter cannot finance the extension of more trade credit due to their small size. Indeed, their propensity to provide trade credit is as high as that of producers of differentiated goods only after controlling for size (Table 2, Panel A). Also, the Compustat sample firms support the notion that limited access to external funds prevents small service firms from providing more trade credit. Being much larger than NSSBF firms, Compustat firms are less likely to be credit constrained. Contrary to NSSBF firms, the service suppliers in the Compustat sample have on average a substantially higher receivables to sales ratio (0.58) than suppliers of standardized (0.23) and differentiated goods (0.17).

While firms buying more services are more rarely allowed to make purchases on account, they are

less often denied trade credit (Panel B, Column 5, Table 2). This suggests that these firms may be more likely to have access to trade credit when they need it. We explore this possibility by considering the reasons why firms are denied trade credit. We find that service providers do not deny credit because of concerns about customers' repayment ability, while providers of differentiated goods do, as noted before.

It is difficult to further evaluate why suppliers may be able to mitigate borrower moral hazard because we lack information about the length of the firms' relationships with their suppliers. If older firms have established relationships, the switching cost hypothesis suggests that trade credit volumes should vary positively with age. We find no such correlation for receivable in Panel A of Table 2. Also, neither suppliers of differentiated goods nor of services deny trade credit because of the lack of established relationships (Panel B of Table 2). Yet, older firms seem to receive more trade credit. To the extent that we already capture firm creditworthiness with the firm credit score and the access to bank credit, this is consistent with the notion that relationships improve access to trade credit.

3.3 Information advantage hypothesis

We attempt to test the information advantage hypothesis by including variables reflecting possible reasons why suppliers know more about their customers than other lenders. First, suppliers in related business lines may have an information advantage, which we proxy with the share of intra-industry trade. This variable turns out not to be significant (Panel A, Column 4, Table 2). Similarly, firms buying more from firms in related business lines do not appear to receive more trade credit (results not reported). Second, suppliers may know more about nearby customers. Yet, we find that firms whose sales are concentrated in the area of their main office do not provide more trade credit (Table 2, Panel A). Third, producing the input may involve learning about the customer, notably when providing

information-related services. To capture this, we include in the receivable equation a dummy that equals one if the firm belongs to an information-related service sector (business services, legal services, commercial engineering, accounting, and research). This dummy is not significant at conventional levels (unreported estimates), suggesting that firms in information-related service industries do not offer more trade credit. This result also indicates that service providers are unlikely to sell more on credit because they have better information about customers' creditworthiness than do other lenders. However, retailers and wholesalers are allowed to make more purchases on account. To the extent that they are likely to interact more frequently with their suppliers, this is consistent with the interpretation that their suppliers have superior information.

While this evidence offers little support for the information advantage hypothesis, it is based on tests of joint hypotheses: the source(s) of the suppliers' information advantage and the implications in terms of trade credit supply. Consequently, our tests are not valid if suppliers know more about their customers for other reasons, such as repeated business interactions or purchase volumes. Furthermore, suppliers' information advantage, may be customer, not industry specific.

To further evaluate the information advantage hypothesis, we explore its implications for the availability of bank credit. Bias and Gollier (1997) argue that the extension of trade credit by suppliers with private information constitutes a credible signal about the customer's creditworthiness. Observing this signal, banks should be more inclined to lend without comprehensive information about the borrower. Based on the available evidence in the banking literature [Degryse and Ongena (2004)], our presumption is that firms borrowing from distant banks for short periods have arm's length relations with their lenders that consequently gather only limited information about their businesses. Firms that are offered trade credit, as captured by the dummy trade credit usage, have, on average, shorter relations with their banks and rely on more distant lenders (Table 2, Panel C). Similarly, we use the number of

banks from which a firm borrows as an inverse measure of the banks' information production.[22] The estimates in Panel C of Table 2 show that firms that are offered trade credit have a larger number of banks. Additionally, firms that receive trade credit pay lower fees for obtaining a bank loan suggesting that banks are more inclined to extend credit to these firms. Other loan characteristics, such as the interest rate on the loan and its maturity do not seem to be related to the supplier's decision to extend trade credit.

These findings are consistent with the notion that trade credit reveals favorable information to other lenders. They cannot be driven by the fact that some firms with large demand for external funds borrow from many banks, because in all regressions we include controls for the firm's credit line, its other financial loans, and its size. While we control for creditworthiness, we cannot exclude the possibility that there is simply more public information available about these firms.

Whether suppliers have an informational advantage or not, the firms' success in approaching less informed banks suggests that suppliers do not enjoy an informational monopoly. Hence, any information that some suppliers have must be available to other suppliers as well as banks. This leads us to conjecture that any trading relationships between buyer and supplier arise because of high switching costs and not because of inside information, as is believed to be the case for bank customer relationships [Sharpe (1990); and Rajan (1992)].

3.4 Further findings

In this subsection, we discuss (1) to what extent our estimates are consistent with other trade credit theories and (2) to what extent these theories could provide alternative explanations for the previous findings.

A common alternative explanation of trade credit is that suppliers sell on credit as a guarantee of

high product quality. Accordingly, more reputable or established firms need to offer less trade credit, because their reputation vouches for the quality of their product [Long, Malitz and Ravid (1993)]. Our estimates contradict this notion: Large firms offer more trade credit, as predicted by financial theories of trade credit. Additionally, while there is some (weak) evidence that young firms provide more trade credit, small and young firms providing services or differentiated products do not appear to offer more trade credit than more established companies (estimates not reported). In our sample, young and small firms behave similarly.

A related concern is that services may be provided on a long-term contract basis. In this case, service firms' higher propensity to provide trade credit could simply reflect the practice of reporting amounts owed for an on-going service as trade credit, even if the service is paid in full once it is completed. As we have no information on how services are provided, we cannot fully disregard this possibility. However, long-term contracts cannot account for the result that firms supplying differentiated product also extend more trade credit. In addition, Section 5 will show that service suppliers do not offer longer payment periods (the effect of buying more services on the due date is statistically insignificant). Hence, our results are unlikely to depend on the fact that payments are made at the end of long-term contracts.

Our results do not depend on industry concentration in the suppliers' market. Panel A of Table 2 shows that the level of industry concentration in the product markets is not related to the receivables to sales ratio.[23] The result could be due to a poor match between the two-digit industry concentration measure and actual market concentration, or even to a weak link between actual concentration and gross margins. Yet, the two-digit industry concentration measure is positively related to the industry's propensity to offer early payment discounts (the correlation coefficient is 35%). This is consistent with the notion that suppliers in concentrated industries attempt to price discriminate. Discounts in turn may account for the weak link between concentration and receivables. Firms in concentrated industries

may give trade credit, but also encourage early repayment by offering discounts. In line with this reasoning, we find that industry payment practices matter for receivables (estimates not reported). In particular, firms offering discounts (dummy Two-Parts) have lower receivables to sales ratios. Together, these findings suggest that price discrimination may be a significant cause of expensive trade credit.

It is important to note that we can no longer identify the effect of product characteristics once we include industry payment practices. Product characteristics and payment practices are highly correlated since our measures vary across industries but not across firms within industries. As documented in Panel C of Table 1, suppliers of services, standardized and differentiated products offer different credit terms to their customers. In particular, firms that are more prone to extend trade credit – namely, firms in the services and differentiated good industries – do so by offering longer payment periods and fewer discounts, thereby enabling their customers to use trade credit finance to a larger extent and at lower cost. The example illustrates the benefit from looking jointly at all trade credit terms when explaining trade credit. We return to this topic in the next section.

Unsurprisingly, the firm-specific controls demonstrate that firms with better access to finance (large firms and firms with a higher ratio of loans to sales) have a higher receivables to sales ratio and that riskier firms receive less trade credit. Interestingly, suppliers are more likely to deny trade credit to more profitable firms, which are also less likely to be offered trade credit. A possible interpretation is that sellers have an incentive to lend to buyers with financial problems that are important for their business, as proposed by Wilner (2001). However, we do not find that this tendency is more accentuated for suppliers of services and differentiated products that may be more dependent on their customers.

Finally, we like to point out that large firms, firms operating in concentrated industries and, especially, firms with many customers make significantly more purchases on account. These findings indicate that suppliers are more generous in providing trade credit to customers that have more bar-

gaining power. A challenge for future theoretical work is to explain why sellers do not simply lower the price to these customers instead.

4. Contract Terms

As argued earlier, a supplier's willingness to extend trade credit is reflected not only in the amount of trade credit, but also in the contract terms. To understand how the contract terms are related to our variables of interest, we need to consider that contract terms are only observed for the subset of firms that are offered trade credit. To correct for the sample selection, we use a two-step Heckman procedure. In the first stage, we estimate the probability that a firm is offered to make purchases on account including the same explanatory variables that we include in Panel B of Table 2 (Column 2). We then include the Mill ratio in the second stage (estimates not reported). Table 3 documents our results for the various contract terms from the buyer's perspective.[24]

[Insert table 3 here]

We find that firms buying a larger proportion of services have a smaller proportion of suppliers offering discounts (Column 1, Table 3), are less likely to be offered discounts by their most important supplier (Column 2), are offered smaller discounts, conditionally on receiving discounts (Column 3), and have longer discount periods (Column 6). These findings suggest that firms buying more services are given weaker incentives for early repayment. To the extent that input prices are not higher when trade credit is cheaper, the results also indicate that firms buying more services receive trade credit at lower cost, although the coefficient for the cost of trade credit is not significant at conventional levels (Column 4). Service suppliers are smaller and believed to have lower debt capacity. Hence, the findings are unlikely to be driven by better financial health.[25] It seems more plausible that service suppliers

have an advantage in controlling borrower opportunism. This may be due to service producers being harder to replace or services being more difficult to divert.

Retailers and wholesalers face stronger incentives for early repayment (Columns 1, 2, and 3 of Table 3) and shorter discount periods (Column 6), and wholesalers face larger penalties for late payment. Since wholesalers and retailers trade highly liquid final products, these findings suggest that the ability of mitigating borrower opportunism contributes to shape trade credit contracts. More surprisingly, retail firms are offered longer payment periods than other buyers (Column 5). This may depend on the fact that these buyers interact frequently with their suppliers that therefore have more information and may be willing to offer better terms.

Firms buying more differentiated goods receive trade credit at a higher cost (Column 4, Table 3). This is at odds with the collateral hypothesis because the higher liquidation value that suppliers of differentiated goods can obtain ought to translate in lower trade credit cost. Also some of the control variables provide interesting evidence. First, firms that have pledged firm assets to guarantee their financial loans obtain cheaper trade credit for longer periods. Since suppliers cannot repossess goods on which other lenders have a lien, this evidence is in direct contrast to the collateral hypothesis. Second, payment periods (Column 6) as well as the length of discount periods (Column 7) are positively related to the ratio of inventories to total assets. This finding is consistent with the collateral hypothesis provided that inventories can be repossessed by the original supplier. Hence, the discount (payment) period must be at most 10 days and the inputs should remain untrasformed. To the extent that inputs are untransformed, this finding is also consistent with the diversion hypothesis, which also ties maturity to the time it takes to convert the input, but not to the 10-days legal constraint. Interestingly, 90% of the firms that buy predominantly differentiated goods have a payment period longer than 10 days. Additionally, more than half of the firms whose inputs are predominantly differentiated goods have a

discount period longer than 10 days. This suggests that even if the collateral hypothesis may have some scope to explain trade credit, at least in the U.S. it cannot be the primary rationale for the existence of trade credit.

We find no evidence that buying inputs from more concentrated industries is related to higher discounts. Perhaps, price discrimination is practiced only by relatively large firms, like the ones surveyed by Ng, Smith, and Smith (1999), which are indeed more likely to offer discounts when they operate in more concentrated industries.

The relation between contract terms and firm characteristics reveals some surprising patterns. Larger firms receive larger discounts, but for shorter periods. It seems that discounts are aimed to encourage early payment by those customers that have financial slack. Suppliers in need of cash would thus target early payment discount offers at larger firms with better access to funds. To the extent that larger firms have the financial slack to take advantage of discount offers, these discounts are essentially price reductions. Alternatively, discounts may represent favorable treatment due to bargaining power. The latter interpretation is consistent with the fact that larger firms are charged smaller penalties for late payment (Column 5, Table 3) and firms with many suppliers are more likely to be offered discounts (Column 2). We also observe that riskier firms are less likely to be offered discounts (Column 2) and are offered smaller discounts (Column 3) as the coefficient of Credit Risk is consistently negative and significant. Possibly, suppliers anticipate that inducing early repayment from firms with financial difficulties may be difficult or impossible. Hence, they do not offer discounts. The absence of a risk premium may also be interpreted along the lines of Wilner (2000), who argues that suppliers subsidize customers in financial distress.

[Insert table 4 here]

To evaluate the full cost of trade credit,we check whether more trade credit is associated with higher input prices (Column 1, Table 4). As a proxy for a firm's average input prices, we use the cost of inputs defined as the ratio between the cost of doing business and sales.[26] We explore whether the cost of inputs is positively related to payables' turnover, which measures the actual use of trade credit, after controlling for total assets, age, number of employees, proxies for firm access to financial loans, and industry fixed effects. Strikingly, we find that firms funding more of their purchases with trade credit have lower, not higher cost of inputs. The effect is similar if we use the 2001 Compustat sample, where we observe the cost of goods sold, but we can only control for total assets, leverage, and industry effects (not reported).

Overall, our analysis suggests that discounts do not reflect firm risk and that early payment discounts overstate the cost of trade credit. Moreover, our results also challenge the view that contract terms vary across industries but not within industries[27] and suggest that they are an important component of the suppliers' decision to offer trade credit.

5. The Use of Trade Credit

A firm's stock of payables as well as the repayment behavior depend both on firm characteristics that affect the demand for trade credit and on the contract terms offered by the suppliers. As before, we proxy for the firms' demand for trade credit using assets, age, the profit to sales ratio, and other variables capturing access to financial loans. In accordance with the theoretical framework and our interpretation of the previous results, we assume that the contract terms are set by suppliers. We thus treat the percentage of purchases on account and the other contract terms as exogenous with respect to the firm's choice of trade credit use and repayment behavior.[28] In the regressions in Table 4, we include

those contract characteristics that we believe to be the most salient for understanding trade debt and the firms' propensity to forgo discounts or to pay late. In other specifications that we do not report, we include different and less judiciously chosen contract characteristics. Their coefficients are insignificant.

The extent to which firms use trade credit depends on the purchases that they are able to make on account (Column 2, Table 4). Other contract characteristics, including the payment period and the discount size (estimates not reported), do not appear to have a significant impact on the payables to assets ratio. Consistent with previous studies, we find that smaller firms use more trade credit.

Firms' repayment behavior reveals several noteworthy patterns. Firms that fear to be denied other loans and firms with financial problems pay a larger fraction of their trade credit late and are more likely to pay after the due date (Columns 3 and 4, Table 4). More surprisingly, large firms and firms with longer bank relationships, which arguably have easier access to bank credit, are more likely to pay late. One possible explanation is that suppliers do not enforce late penalties for firms with good payment records and for large firms. Although we are not aware of any direct evidence, such a size bias in the enforcement of penalties seems likely in view of anecdotal evidence that many suppliers accept, from customers with bargaining power, discounted payments after the discount period has elapsed [Smith (1987); and Ng, Smith, and Smith (1999)]. Weak contract enforcement may also explain why higher penalties do not significantly induce more timely repayment or why firms with a longer payment period are more likely to pay after the due date. Indeed, the actual trade credit maturity, proxied by the payables' turnover, increases with both contractual maturity and penalties (Column 5). This suggests that suppliers demand penalties when customers are extremely slow in their payments.

Column 6 of Table 4 documents how firms respond to financial incentives. A larger discount increases the likelihood that a firm takes advantage of the discount's offer. Firms with longer bank-firm relationships are more likely to take advantage of discounts. Similarly, firms are more likely to forgo

discounts if they fear being denied bank loans or have financial problems. Not surprisingly, we find that these firms fund their purchases with trade credit for longer periods. This is again consistent with Petersen and Rajan (1994), who find that firms with less access to bank loans are less likely to take advantage of early payment discounts. In addition to being more prone to pay late, large firms are also less likely to take advantage of early payment discounts. Given that large firms ought to have better access to other sources of credit, a possible explanation is again that suppliers concede discounts to large firms even after the discount period has elapsed.

To summarize, firms appear to respond to financial incentives implicit in the contract terms. They take cheap trade credit when they can get it and utilize costly trade credit when they must. However, some firms appear to be able to take advantage of their suppliers beyond the contractual agreement by paying late or by unilaterally extending the discount period.

6. Conclusions

We relate trade credit volumes and contract terms to different product characteristics and aspects of bank-firm relationships. Overall, the evidence seems to favor theories based on borrower opportunism and suppliers' informational advantage. Some of our findings challenge the common view that trade credit is primarily a last resort for firms that are running out of bank credit. First, trade credit seems to facilitate financing by uninformed lenders. Second, a majority of the firms in our sample appears to receive cheap trade credit. Third, firm-specific characteristics, possibly capturing customer bargaining power, affect contract terms (even for firms within the same industry), questioning the notion that contract terms vary across industries but not within industries.

Our results also indicate paths for future theoretical research. Suppliers appear to carefully choose

contract terms to give incentives to firms. Current theories, however, tend to emphasize only one or two. For example, the price discrimination theory deals only with early payment discounts. A natural ambition for future work is to develop models that relate suppliers' reasons for offering trade credit to the type of optimal contract they offer. Such models would provide more stringent testable implications concerning the relationships between contract terms, credit volumes, and firm characteristics that we have documented here.

References

Aghion, P., and P. Bolton. 1992. An Incomplete Contracts Approach to Financial Contracting. *Review of Economic Studies*, 59:473-494.

Berger, A. N., N. H. Miller, M. Petersen, R. G. Rajan, and J. C. Stein. 2005. Does Function Follow Organizational Form? Evidence from the Lending Practices of Large and Small Banks. *Journal of Financial Economics*, 76:237–269.

Berger, A. N., and G. F. Udell. 1995. Relationship Lending and Lines of Credit in Small Firm Finance. *Journal of Business*, 68:351–381.

Biais, B., and C. Gollier. 1997. Trade Credit and Credit Rationing. *Review of Financial Studies*, 10:903–937.

Brennan, M. J., V. Maksimovic, and J. Zechner. 1988. Vendor Financing. *Journal of Finance*, 43:1127–1141.

Brick, I E., and K. H. Fung. 1984. Taxes and the Theory of Trade Debt. *Journal of Finance*, 39:1169–1176.

Burkart, M., and T. Ellingsen. 2004. In–Kind Finance. A Theory of Trade Credit. *American Economic Review,* 94:569–590.

Carletti, E. 2004. The Structure of Bank Relationships, Endogenous Monitoring and Loan Rates. *Journal of Financial Intermediation*, 13:58–86.

Cocco, J., F. J. Gomes, and N. C. Martins. 2005. Lending Relationships in the Interbank Market. Working Paper, London Business School.

Credit Research Foundation. 2005. The Business of Fraud: What You Don't Know Can Hurt You? https://www.crfonline.org/store/

Cunat, V. M. 2007. Trade Credit: Suppliers as Debt Collectors and Insurance Providers. *Review of Financial Studies*, 20:491–527.

Degryse H., and S. Ongena. 2004. The Impact of Technology and Regulation on the Geographical Scope of Banking. *Oxford Review of Economic Policy*, 20:571–590.

Demirguc-Kunt, A., and V. Maksimovic. 2002. Firms as Financial Intermediaries: Evidence from Trade Credit Data. Working Paper, University of Maryland.

Financial Times. 2004. Pity the Poor Old Suppliers. November 15:16.

Economist. 2007. Big Chains Enjoy a Buyer's Market, February 17:74.

Elliehausen, G. E., and J. D. Wolken 1993. The Demand for Trade Credit: An Investigation of Motives for Trade Credit Use by Small Businesses. Working Paper, Board of Governors of the Federal Reserve System.

Ferris, J. S. 1981. A Transactions Theory of Trade Credit Use. *Quarterly Journal of Economics*, 94:243–270.

Fisman, R., and I. Love 2003. Trade Credit, Financial Intermediary Development and Industry Growth. *Journal of Finance*, 58:353–374.

Frank, M., and V. Maksimovic. 1998. Trade Credit, Collateral, and Adverse Selection. Working Paper, University of Maryland.

Gavin, Larry T. 1996. Credit, Information, and Trust in the Law of Sales: The Credit Seller's Right of Reclamation. *UCLA Law Review*, 44:247–360.

Giannetti, M. 2003. Do Better Institutions Mitigate Agency Problems? Evidence from Corporate Finance Choices. *Journal of Financial and Quantitative Analysis*, 38:185–212.

Hart, O. D., and J. Moore. 1994. A Theory of Debt Based on the Inalienability of Human Capital. *Quarterly Journal of Economics*, 109:841–879.

Jain, N. 2001. Monitoring Costs and Trade Credit. *Quarterly Review of Economics and Finance*, 41:89–110.

Johnson, S., J. McMillan, and C. Woodruff. 2002. Courts and Relational Contracts. *Journal of Law, Economics and Organization,* 18:221–277.

Kaplan, S. N., and P. J. Stromberg. 2003. Financial Contracting Theory Meets the Real World: An Empirical Analysis of Venture Capital Contracts. *Review of Economic Studies*, 70:281–315.

Lee, Y. W., and J. D. Stowe. 1993. Product Risk, Asymmetric Information, and Trade Credit. *Journal of Financial and Quantitative Analysis*, 28:285–300.

Long, M. S., I. B. Malitz, and S. A. Ravid. 1993. Trade Credit, Quality Guarantees, and Product Marketability. *Financial Management*, 22:117–127.

Longhofer, S. D., and J. A. C. Santos. 2003. The Paradox of Priority. *Financial Management*, 32:69–81.

McMillan, J., and C. Woodruff. 1999. Interfirm Relationships and Informal Credit in Vietnam. *Quarterly Journal of Economics,* 114:1285–1320.

Mian, S. L., and C. W. Smith. 1992. Accounts Receivable Management Policy: Theory and Evidence. *Journal of Finance*, 47:169–200.

Miwa, Y., and J. M. Ramseyer. 2005. Trade Credit, Bank Loans and Monitoring: Evidence from Japan. Harvard John M. Olin Center for Law, Economics and Business Discussion Paper No. 527.

Nadiri, M. I. 1969. The Determinants of Trade Credit in the U.S. Total Manufacturing Sector. *Econometrica*, 37:408–423.

Nilsen, J. H. 2002. Trade Credit and the Bank Lending Channel. *Journal of Money, Credit and Banking*, 34:226–253.

Ng, C. K., J. K. Smith, and R. L. Smith 1999. Evidence on the Determinants of Credit Terms in Interfirm Trade. *Journal of Finance*, 54:1109–1129.

Petersen, M. A., and R. G. Rajan. 1994. The Benefits of Firm-Creditor Relationships: Evidence from Small Business Data. *Journal of Finance*, 49:3–37.

Petersen, M. A., and R. G. Rajan. 1995. The Effect of Credit Market Competition on Lending Relationships. *Quarterly Journal of Economics*, 60:407–444.

Petersen, M. A., and R. G. Rajan. 1997. Trade Credit: Theory and Evidence. *Review of Financial Studies*, 10:661–691.

Pryor, F. L. 2001. New Trends in U.S. Industrial Concentration. *Review of Industrial Organization,* 18:301–326.

Rajan R. G., and L. Zingales. 1995. What Do We Know about Capital Structure? Some Evidence from International Data. *Journal of Finance*, 50:1421–1460.

Rauch, J. E. 1999. Networks versus Markets in International Trade, *Journal of International Economics*, 48:7–35.

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

Smith, J. 1987. Trade Credit and Informational Asymmetry. *Journal of Finance*, 42:863–869.

Uchida, H., G. F. Udell, and W. Watanabe. 2007. Are Trade Creditors Relationship Lenders? Working Paper, Indiana University.

Von Thadden, E. L. 1995. Long-Term Contracts, Short-Term Investment and Monitoring. *Review of Economic Studies*, 62:557–575.

Wilner, B. S. 2000. The Exploitation of Relationships in Financial Distress: The Case of Trade Credit. *Journal of Finance*, 55:153–178.

Wolken, J. D. 1998. "New" Data Sources for Research on Small Business Finance. *Journal of Banking and Finance*, 22:1067–1076.

Notes

1. For evidence on capital structure, see Rajan and Zingales (1995) and Giannetti (2003); for the relation between bank credit rationing and trade credit, see Petersen and Rajan (1997).

2. This is the case unless suppliers establish a lien, which is a costly and infrequent practice. Additionally, it is impossible to establish a lien if the good is transformed in the production process.

3. See also Lee and Stowe (1993), and Long, Malitz, and Ravid (1993).

4. The most common explanations of trade credit that we neglect are taxes [Brick and Fung (1984)] and liquidity management [Ferris (1981)].

5. The supplier's repossession advantage also depends on priority rules and bankruptcy laws that may severely limit its relevance in the U.S. In fact, trade credit is generally junior debt and an unsecured trade creditor can reclaim a good that has not been transformed only within ten days from the sale [Garvin (1996)]. In addition, establishing a security interest on the good is a costly and infrequent practice.

6. For our identification assumption to be valid, the differentiated product should not be taylored to the the need of an unique customer, because in this case its liquidation value would clearly be zero. Since differentiated products include a broad range of sectors, we believe that from an empirical point of view it is unlikely that a large proportion of differentiated products has an unique potential user.

7. We consider payments after the due date t_2 to be contract violations. The late payment penalty could be viewed as an additional contract term.

8. For example, the often used contract terms "30 days net, -2% if paid within 10 days" imply an annualized trade credit interest rate of 44.59%.

9. The logic of the quality guarantee theories has no apparent implications for the cost of trade credit.

10. If both suppliers and customers are locked in the relationship, it is unclear to what extent the surplus generated by the lending advantage is transferred to the borrower.

11. As a rule of thumb, U.S. banks are willing to give short-term loans (factoring) up to about 80% of the value of the receivables [Mian and Smith (1992)]. Therefore, only about 20% of the receivables crowd out other investments by the supplier. Miwa and Ramseyer (2005) also provide evidence that, thanks to the possibility of discounting notes, suppliers are able to provide trade credit at a cost that does not exceed the interest rate on financial loans.

12. We further attempt to address concerns related to omitted industry factors by controlling for a large number of firm-specific characteristics.

13. The NSSBF data include information on the contract terms at which trade credit is offered to firms but not on the terms at which firms extend credit.

14. As explained in Section 2, the inclusion of retailers and wholesalers in the analysis allows us to evaluate an implication of the diversion hypothesis, as these firms are likely victims of credit frauds. Retailers and wholesalers are a particular type of service firms as they trade highly liquid goods even though their value added is a service (i.e., selling the good). For this reason, we check whether the results are sensitive to the exclusion of retailers and wholesalers. All results that we omit for brevity are qualitatively invariant.

15. In the survey, accounts receivable include invoices to customers for goods or services that have been delivered but not yet paid, but not eventual credit card receivables, which are categorized as "other assets." Other studies using the NSSBF [e.g., Petersen and Rajan (1997)] also proxy firm supply of trade credit with accounts receivable.

16. See for instance *Financial Times* (November 15, 2004) and *Economist* (February 17, 2007).

17. An alternative way to estimate the contract terms would be to use Seemingly Unrelated Regression Equations (SURE), to account for the correlation of errors across different equations, similarly to Cocco, Gomes, and Martins (2005), who study contracts in the interbank market. While SURE is more efficient, it is more likely to lead to inconsistent estimates. For this reason, we have chosen to use single equation estimation methods.

18. Uchida, Udell, and Watanabe (2007) use a similar proxy for the actual maturity of trade credit.

19. We estimate regressions in which the dependent variable is truncated by ordinary least squares instead of using a Tobit model, because the dependent variables' distribution is non-normal. Estimates using a Tobit model are similar to the ones we report.

20. The impact of the firm-specific variables is similar in the benchmark regression including sectoral dummies and in the specifications including only the industry characteristics mentioned above. This gives us confidence that our estimates are unlikely to be biased by omitted variables and that product characteristics indeed capture salient sectoral differences. Furthermore, the reported results are robust to the inclusion/exclusion of a number of firm-specific characteristics that we do not report.

21. Interestingly, this result obtains only if we control for firm assets. In our view, this is due to the fact that assets capture the firms' access to funds better than other proxies for firm size, such as the number of employees.

22. Carletti (2003) provides a theoretical justification.

23. Non-reported estimates reveal that the average concentration in the input market is not related to the amount of trade credit that a firm is offered.

24. Our results on the effect of firm characteristics are similar to the ones we report if we include industry dummies instead of the proxies for the use of differentiated products and services in the second stage.

25. The proportion of services used as input is not related to the interest rate on bank loans (Panel C, Table 2).

26. As the cost of doing business includes both input and labor costs, we control for the number of employees and include industry dummies.

27. The effects of firm-specific characteristics remain statistically significant when we include industry dummies.

28. In other not reported specifications, we instrument the contract terms using our industry-specific variables. The results remain qualitatively invariant although the significance levels are often lower.

Table 1. Descriptive statistics

Panel A: Firms Characteristics

Assets are total assets in million of dollars, Age is in years, and Sales are in million of dollars per year. Cost of Inputs/Sales is defined as the ratio of the cost of doing business to sales. Credit Line is the bank credit limit on the firm's overdraft facility divided by sales. Other Loans include all loans other than credit lines and trade credit. Credit Risk is the firm's credit risk and varies between 1 (low) and 5 (high). Fear of Denial is a dummy variable that takes the value 1 if the firm needed credit during the last three years but did not apply due to fear of denial and zero otherwise. Financial Problems is a dummy variable that takes the value 1 if the firm reports that its most important problem is related to financing, interests rates, or cash flow and zero otherwise. Unused Credit is the difference between the bank credit limit and the amount drawn as a fraction of assets. Average Bank Distance is the average distance in miles between the firm's and the banks' headquarters. Average Bank Months is the average number of months of the firm's relationship with its banks. Guarantee is a dummy variable that takes the value 1 if the firm has pledged any of its assets as collateral and zero otherwise. Last Loan Interest Rate is the annualized interest rate in percentage points on the last bank loan received by the firm. Fees are the total dollar cost of obtaining the bank loan, which includes title transfer taxes, lawyer fees, environmental surveys, appraisals, application fees, other expenses at the time of the last loan application, and fees to close the loan.

Firm Characteristics	Means (Standard Deviations) Whole Sample	Standardized Goods	Differentiated Goods	Services
Obs.	3489	497	270	2722
Assets	1.48 (5.374)	2.46 (7.97)	3.91 (9.50)	1.06 (3.95)
Age	14.46 (12.15)	16.30 (12.68)	16.70 (13.36)	13.87 (11.86)
Sales	3.473 (15.1)	6.03 (31.0)	5.74 (1.07)	2.78 (10.2)
Profit/Sales	-0.040 (4.94)	0.028 (1.23)	-0.069 (1.67)	-0.049 (5.54)
Fixed Assets/Assets	0.30 (0.31)	0.32 (0.30)	0.32 (0.26)	0.29 (0.31)
Inventories/Sales	0.14 (0.13)	0.11 (0.57)	0.21 (0.72)	0.13 (0.66)
Cost of Inputs/Sales	1.09 (5.07)	0.99 (1.23)	1.09 (1.76)	1.10 (5.69)
No. of Employees/Assets	23.78 (53.67)	32.77 (65.38)	48.89 (79.19)	19.64 (46.89)
Credit Line	0.14 (1.66)	0.09 (0.22)	0.14 (0.55)	0.15 (1.87)
Other Loans/ Sales	0.09 (0.97)	0.03 (0.12)	0.14 (1.02)	0.09 (1.05)
Credit Risk	2.98 (1.04)	2.91 (1.12)	2.89 (1.22)	3.00 (1.01)
Fear of Denial	0.22 (0.42)	0.23 (0.42)	0.20 (0.40)	0.23 (0.42)
Financial Problems	0.12 (0.32)	0.15 (0.36)	0.12 (0.33)	0.11 (0.31)
Unused Credit	2.76 (45.30)	1.04 (3.30)	0.83 (3.28)	3.54 (54.21)
Number of Banks	2.44 (1.71)	2.54 (1.73)	2.87 (2.11)	2.37 (1.65)
Average Bank Distance	148 (286)	131 (232)	167 (309)	149 (292)
Average Bank Months	86 (80)	92 (84)	84 (69)	86 (80)
Guarantee	0.50 (0.50)	0.60 (0.49)	0.64 (0.48)	0.46 (0.50)
Last Loan Interest rate	11 (36)	12 (33)	7.2 (28)	12 (38)
Fees	10649 (139735)	36208 (328031)	16137 (71848)	3639 (18298)

Table 1. Descriptive statistics

Panel B: Industry Characteristics

Own Concentration is the market share of the eight largest firms in the firm's two-digit industry (Pryor's concentration index). Input Concentration is the weighted sum of Pryor's concentration indices in the suppliers' industries where the weights correspond to the input shares used by the firms as given by the input-output tables. Differentiated Inputs is the share of inputs that comes from sectors producing differentiated products. Service Inputs and Standardized Inputs are defined accordingly. Own Industry Share is the share of output sold to firms in the same industry.

	Means (Standard Deviations)			
Sector Characteristics	Whole Sample	Standardized Goods	Differentiated Goods	Services
Own Concentration	19.87	46.61	42.13	16.07
	(13.42)	(14.50)	(11.11)	(8.92)
Input Concentration	0.16	0.36	0.27	0.13
	(0.08)	(0.11)	(0.08)	(0.04)
Differentiated Inputs	0.058	0.071	0.140	0.046
	(0.068)	(0.067)	(0.107)	(0.050)
Service Inputs	0.280	0.198	0.198	0.297
	(0.051)	(0.036)	(0.026)	(0.037)
Standardized Inputs	0.068	0.388	0.246	0.023
	(0.125)	(0.092)	(0.190)	(0.020)
Own Industry Share	0.102	0.235	0.130	0.089
	(0.053)	(0.072)	(0.085)	(0.027)

Table 1. Descriptive statistics

Panel C: Suppliers' perspective

Net Terms are the number of days of the typical industry payment period. Two-Part is a dummy variable that takes the value 1 if discounts are common in the industry and zero otherwise. Both variables are defined at the two-digit industry level. The source for both variables is Ng, Smith, and Smith (1999).

	Means (Standard Deviations)			
Receivables Characteristics	Whole Sample	Standardized Goods	Differentiated Goods	Services
Receivables/Sales	0.100 (0.513)	0.161 (1.161)	0.135 (0.248)	0.086 (0.294)
Net Terms	29.34 (3.82)	27.59 (8.17)	30 (0)	29.59 (2.44)
Two-Part	0.078 (0.268)	0.155 (0.362)	0.444 (0)	0.027 (0.163)

Table 1. Descriptive statistics

Panel D: Buyers' perspective

Purchases on Account is the percentage of purchases made on account rather than paid cash at or before delivery. Number of Suppliers is the number of suppliers offering to sell on account. Denied Trade Credit is a dummy variable that takes the value 1 if any supplier denied trade credit during the previous year and zero otherwise. For the subsample of firms that have been denied trade credit, Reason to Deny-Repayment Ability is a dummy variable, which takes the value 1 if the firm was denied trade credit because of suppliers' concerns about the ability to repay and zero otherwise. Similarly, Reason to Deny-Lack Relationship is a dummy variable that takes the value 1 if the firm was denied trade credit because of the lack of an established relationship with the supplier and zero otherwise. Due Date is the mean of each interval in which the bill of the most important supplier is due. The intervals range from immediate payment, payment between 1 and 7 days, …., up to payment more than 90 days after delivery. Discount Dummy is a dummy variable that takes the value 1 if the most important supplier offers cash discounts and zero otherwise. SOD stands for Suppliers Offering Discounts and is the percentage of suppliers that offer discounts. Discount Period is the number of days for which the main supplier's early payment discount offer is valid. Discount Size is the percentage price reduction associated with early payment offered by the main supplier. Annualized Interest Rate on Trade Credit is calculated as $\left(1+Discount\ Size/(100-Discount\ Size)\right)^{\frac{365}{DueDate}}-1$; the discount size is set equal to zero if suppliers do not offer discounts. Penalty Size is the monthly interest that the main supplier charges if bills are paid late.

	Means (Standard Deviations)			
Credit Contracts	Whole Sample	Standardized Goods	Differentiated Goods	Services
Purchases on Account	47.73 (42.65)	65.69 (40.27)	67.99 (37.60)	42.44 (42.05)
Number of Suppliers	37.56 (242.57)	49.59 (134.24)	74.46 (139.90)	31.70 (264.60)
Denied Trade Credit	0.09 (0.28)	0.10 (0.30)	0.11 (0.32)	0.08 (0.27)
Reason to Deny-Repayment Ability	0.52 (0.50)	0.54 (0..50)	0.42 (0.50)	0.53 (0.50)
Reason to Deny-Lack Relationship	0.24 (0.43)	0.20 (0.40)	0.38 (0.50)	0.23 (0.42)
Due Date	24.98 (12.28)	27.24 (12.27)	24.87 (11.37)	24.7 (12.46)
Discount Dummy	0.31 (0.46)	0.50 (0.50)	0.50 (0.50)	0.25 (0.43)
SOD	21.27 (31.99)	30.62 (36.37)	28.11 (31.90)	18.86 (30.37)
Discount Period	14.16 (16.04)	13.19 (6.67)	13.59 (11.12)	14.76 (19.78)
Discount Size	2.39 (2.56)	2.37 (2.20)	1.73 (1.03)	2.57 (2.93)
Discount Size/(Due Date-Discount period)	0.13 (0.18)	0.15 (0.18)	0.09 (0.07)	0.14 (0.19)
Annualized Interest Rate on Trade Credit	27.86 (2342)	28.93 (2783)	26.51 (25.10)	27.71 (2467)
Penalty Size	1.18 (2.24)	1.39 (2.57)	0.81 (1.50)	1.19 (2.23)

Table 1. Descriptive statistics

Panel E: Correlation Table for Contract Terms

All variables are defined in Panel D. Starred correlations are statistically significant at the 10 percent level.

	Account Ratio	SOD	Discount Size	Discount Period	Penalty Size	Due Date
Purchases on Account	1					
SOD	0,1028*	1				
Discount Size	-0,0203	0,0309	1			
Discount Period	-0,0335	0,0127	0,1521*	1		
Penalty Size	0,0347*	0,0845*	0,2207*	0,0308	1	
Due Date	-0,0547*	0,0257	0,0024	0,1070*	0,0253	1

Table 1. Descriptive statistics

Panel F: Use of Trade Credit

Payables' Turnover is defined as the ratio of payables to the cost of doing business, multiplied by 365. Trade Credit Usage is a dummy variable that takes the value 1 if the firm used trade credit during the past year and zero otherwise. Discount Usage is the fraction of discount offers that firms take advantage of. Late Dummy takes the value 1 if the firm has paid after the due date during the previous year and zero otherwise. Late Fraction is the percentage of purchases on account paid after the due date.

	Means (Standard Deviations)			
Credit Usage	Whole Sample	Standardized Goods	Differentiated Goods	Services
Payables/ Assets	0.20 (0.64)	0.06 (0.31)	0.19 (0.53)	0.38 (4.01)
Payables' Turnover	31.00 (79.06)	47.74 (96.82)	39.31 (84.21)	28.39 (74.45)
Trade Credit Usage	0.66 (0.47)	0.80 (0.40)	0.84 (0.36)	0.62 (0.49)
Discount Usage	0.57 (0.44)	0.60 (0.45)	0.45 (0.44)	0.59 (0.44)
Late Dummy	0.46 (0.50)	0.48 (0.50)	0.55 (0.50)	0.44 (0.50)
Late Fraction	0.14 (0.26)	0.16 (0.29)	0.15 (0.24)	0.13 (0.26)

Table 2. The volume of trade credit

Panel A: Suppliers' Perspective

The dependent variable is the ratio of accounts receivable to sales. All independent variables are defined in Table 1, except for the following. Same Area is a dummy variable that takes the value 1 if the firm's main office is located in its primary sales area and zero otherwise. Retail is a dummy variable that takes the value 1 if the firm is a retail firm and zero otherwise. Wholesale is defined analogously for wholesalers. Constants are included in all regressions but parameter estimates are not reported. In Column (1), 59 two-digit SIC indicators are also included. Estimates in Column (3) are based on the 2001 Compustat sample and all the industry-level variables are defined using the four-digit SIC disaggregation. Parameters have been estimated by ordinary least squares. Numbers in parentheses denote t-values. Standard errors are White-corrected for heteroskedasticity and clustered at the industry level. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

	(1)	(2)	(3) Compustat	(4)
Log Assets	0.02 (6.89)***	0.02 (5.56)***	0.03 (2.70)***	0.02 (4.93)***
Profit/Sales	-0.01 (-0.21)	-.002 (-0.51)	0.00003 (3.15) ***	-0.004 (-0.32)
Fixed Assets/ Assets	-0.15 (-4.35)***	-0.13 (-4.77)***	-0.02 (-3.27)***	-0.11 (-3.89)***
Log Age	-0.01 (-1.73)*	-0.01 (-0.93)		-0.001 (-0.17)
Credit Line	0.01 (0.81)	0.002 (0.44)		0.002 (0.16)
Other Loans/ Sales	0.02 (1.91)*	0.02 (1.82)*		0.02 (1.57)
Credit Risk	0.01 (0.90)	-.00003 (-0.01)		0. 0001 (0.01)
Average Bank Distance	-.00003 (-2.21)***	-.00002 (-2.26)**		-0.00002 (-1.58)
Average Bank Months	.0001 (1.68)*	.000048 (1.12)		0.00002 (0.50)
Same Area	-0.03 (-1.16)	-0.01 (-1.16)		-0.02 (-2.04)**
Differentiated Goods		0.05 (2.40)**	0.02 (2.58)***	
Services		0.04 (2.34)**	0.03 (3.25)***	
Retail		-0.06 (-2.33)**	-0.04 (-3.67)***	
Wholesale		-0.1 (-5.77)***	-0.12 (-10.25)***	
Own Concentration		-.0003 (-0.43)	0.00003 .27)	-.0004 (-0.46)
Own Industry Share				0.02 (0.15)
Obs.	3299	2696	7434	2696
R-squared	0.04	0.06	0.08	0.04

Table 2. The volume of trade credit

Panel B: Buyers' Perspective

All variables are defined in Table 1, except for (Diff Inp) x Financial Problems, which interacts the Differentiated Inputs dummy with the Financial Problems dummy. Constants are included in all regressions but parameter estimates are not reported. In Column (1), 59 two-digit SIC indicators are also included. In Columns (1), (2), (3), and (6), the dependent variable is the percentage of purchases made on account, and parameters are estimated by ordinary least squares. In Column (4), the dependent variable is a dummy equal to 1 if the firm uses trade credit and zero otherwise. In Column (5), the dependent variable is a dummy equal to 1 if the firm using trade credit has been denied trade credit and equal to zero otherwise. In Column (7), the dependent variable is a dummy variable, defined only for firms that have been denied trade credit, which takes the value 1 if the firm was denied trade credit because of suppliers' concerns about the ability to repay and zero otherwise. In Column (8), the dependent variable is a dummy variable, defined only for firms that have been denied trade credit, which takes the value 1 if the firm was denied trade credit because of the lack of an established relationship with the supplier and zero otherwise. Firms that do not use trade credit are not included. In Columns (4) and (5), estimates are obtained using a probit model. In Columns (7) and (8), parameters are estimated using a probit model with sample selection. The selection equation is estimated like in Column (5), but we include industry dummies instead of the industry-specific variables. In Columns (4), (5), (7), and (8), we report marginal effects, calculated by taking the mean of all independent variables, instead of parameter estimates. Numbers in parentheses denote t-values. Standard errors are White-corrected for heteroskedasticity and clustered at the industry level. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

	(1) Purchases on Account	(2) Purchases on Account	(3) Purchases on Account	(4) Trade Credit Usage	(5) Trade Credit Denial	(6) Purchases on Account	(7) Reason to Deny-- Repayment Ability	(8) Reason to Deny-- Lack Relationship
Log Assets	5.04 (11.45)***	5.46 (11.62)***	5.633 (11.66)***	0.05 (9.19)***	-0.007 (-2.52)**	-0.70 (-2.67)**	-0.10 (-2.48)**	0.06 (0.94)
Profit/Sales	-0.12 (-0.81)	0.16 (0.40)	-0.721 (-1.71)*	-0.02 (-2.06)**	0.008 (2.07)**	-0.32 (-1.47)		
Fixed Assets/Assets	-3.05 (-0.97)	-3.31 (-0.88)	-2.929 (-0.79)	-0.03 (-0.78)	-0.002 (-0.09)	2.74 (1.26)		
Log Age	3.01 (2.78)***	0.16 (0.40)	3.268 (2.47)**	0. 03 (1.86)*	-0.021 (-2.00)**	-0.42 (-0.60)	-0.41 (-2.62)***	0.68 (3.11)**
Credit Line	-0.22 (-1.74)*	-0.48 (-1.12)	-0.949 (-1.60)	-0.02 (-1.57)	0.003 (0.29)	-0.35 (-1.46)		
Other Loans/ Sales	0.12 (0.20)	-0.02 (-0.03)	-0.105 (-0.14)	-0.003 (0.35)	-0.002 (-0.30)	0.57 (1.03)		
Credit Risk	-1.66 (-2.53)**	-1.39 (-1.69)*	-1.441 (-1.58)	-0.004 (-0.33)	0.037 (4.67)***	-1.02 (-1.99)*	0.09 (0.53)	0.18 (0.63)
Average Bank Distance	0.001 (0.51)	0.0002 (0.08)	0.000 (0.11)	0.000 (1.76)	0.000 (0.43)	-0.04 (-2.40)**		

Average Bank Months	-0.01 (-0.88)	-0.02 (-1.57)	-0.020 (-1.70)*	-0.000 (2.75)***	-0.000 (-0.38)	-0.01 (-0.86)		
Guarantee	6.01 (2.99)***	4.83 (2.23)***	5.440 (2.52)**	0.074 (3.49)**	0.007 (0.52)	-0.44 (-0.34)		
Differentiated Inputs		32.10 (1.93)*	28.184 (0.93)	0.57 (2.36)**	-0.014 (-0.15)	23.94 (2.17)**	1.76 (3.11)**	-1.42 (-1.80)*
Service Inputs		-58.29 (-2.83)***	-57.622 (-2.59)**	-0.57 (-1.71)*	-0.218 (-1.94)*	-17.45 (-1.43)	-0.81 (-1.17)	0.47 (0.50)
(Diff Inp) x Credit Risk			1.930 (0.24)					
Retail		11.04 (3.78)***	11.60 (3.87)***	.04 (1.01)	0.029 (2.25)**	7.27 (3.71)***	0.27 (3.02)***	-0.13 (-1.99)**
Wholesale		9.38 (3.87)***	11.606 (3.87)***	0.10 (3.62)***	0.004 (0.31)	3.58 (2.30)**	0.22 (3.10)*	-0.19 (-2.14)**
Own Concentration		0.23 (2.92)***	10.011 (3.88)***	0.001 (1.12)	0.013 (2.31)*	0.04 (0.86)		
Number of Suppliers			0.256 (3.05)***			17.97 (28.50)***		
Obs.	3299	2234	2234	2234	1543	2234	139	139
R-squared	0.23	0.23	0.22	0.13	0.08	0.59		

Table 2. The volume of trade credit

Panel C: Bank Relationships and Trade Credit Usage

All dependent and independent variables are defined in Table 1. Constants are included in all regressions but parameter estimates are not reported. Numbers in parentheses denote t-values. All parameters are estimated by ordinary least squares. Standard errors are White-corrected for heteroskedasticity and clustered at the industry level. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

	(1) Average Bank Distance	(2) Average Bank Months	(3) Fees	(4) Number of Banks	(5) Interest Rate on Last Loan	(6) Maturity of Last Loan
Log Assets	20.248	-0.401	4,637.368	0.310	-0.329	2.055
	(7.43)***	(0.56)	(2.71)***	(18.36)***	(5.53)***	(1.73)*
Profit/Sales	-2.087	1.016	-1,206.329	0.003	0.215	3.777
	(-0.83)	(1.82)*	(0.42)	(0.14)	(1.16)	(1.57)
Log Age	-18.538	42.412	-4,168.736	-0.062	-0.226	-3.714
	(-2.15)*	(15.62)**	(-0.90)	(-1.42)	(-1.64)	(-0.95)
Credit Line	-0.562	0.654	5,925.576	0.025	0.119	0.675
	(0.22)	(1.16)	(0.71)	(1.39)	(0.62)	(0.10)
Other Loans/ Sales	0.371	-0.219	39.893	0.009	0.734	31.077
	(0.09)	(-0.33)	(0.00)	(0.29)	(1.70)*	(1.84)*
Credit Risk	3.618	-1.299	-9,868.846	0.133	0.171	-3.853
	(0.58)	(-0.84)	(-1.04)	(3.95)**	(2.11)**	(-1.81)*
Trade Credit Usage	32.828	-7.583	-6,199.356	0.217	0.017	-6.461
	(2.39)**	(-2.06)**	(-1.76)*	(3.15)**	(0.06)	(-0.86)
Differentiated Inputs	117.024	-59.515	-93,385.352	1.427	-1.204	-92.330
	(1.32)	(-2.90)***	(-0.98)	(1.41)	(0.56)	(-2.73)***
Service Inputs	111.881	7.289	-307,869.587	1.530	0.314	-77.596
	(0.92)	(0.21)	(-1.31)	(1.79)	(0.19)	(-1.48)
Obs.	2234	2234	555	2234	555	516
R-squared	0.03	0.18	0.02	0.20	0.13	0.04

Table 3. Contract terms

All dependent and independent variables are defined in Table 1. Constants are included in all regressions but parameter estimates are not reported. Parameters in Column (5) are estimated by ordinary least squares. In Column (2), parameters have been estimated using a maximum-likelihood probit model with sample selection. In all other columns, parameters are estimated using a two-stage Heckman selection model. The selection equation is presented in Column (4) of Table 2, Panel B. In Column (2), we report marginal effects, calculated by taking the mean of all independent variables, instead of parameter estimates. Numbers in parentheses denote t-values. Standard errors are White-corrected for heteroskedasticity and clustered at the industry level. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

	(1) SOD	(2) Discount Dummy	(3) Discount Size	(4) Annualized Interest Rate	(5) Penalty	(6) Discount Period	(7) Due Date
Log Assets	0.670	-0.006	0.019	347.436	-0.03	-0.046	-0.373
	(1.52)	(0.86)	(3.87)***	(2.25)**	(-2.67)**	(-2.08)**	(-1.41)
Profit/Sales	0.095	-0.014	0.001	-11.333	0.02	-0.001	0.405
	(0.15)	(-2.15)**	(0.58)	(-0.11)	(1.76)*	(-0.07)	(2.26)**
Fixed Assets/ Assets	-1.314	0.050	0.034	-235.612	0.051	-0.088	-3.360
	(-0.48)	(1.31)	(2.25)**	(-0.54)	(0.91)	(-0.73)	(-1.90)*
Log Age	1.094	0.013	0.017	188.813	0.012	-0.031	0.772
	(1.04)	(0.77)	(1.37)	(0.94)	(0.54)	(-0.62)	(1.67)*
Credit Line	0.045	-0.022	0.021	-109.661	0.011	0.083	0.548
	(0.05)	(-2.52)**	(1.17)	(-0.24)	(0.64)	(0.56)	(2.17)**
Other Loans/Sales	-0.405	-0.009	0.004	7.130	0.016	0.007	0.106
	(1.24)	(-1.39)	(1.87)*	(0.03)	(1.19)	(0.14)	(0.28)
Credit Risk	-0.590	-0.023	-0.013	-27.643	-0.009	0.013	0.489
	(-0.83)	(-2.66)***	(-2.85)***	(-0.23)	(-0.70)	(0.45)	(1.02)
Average Bank Distance	-0.001	0.000	0.000	-0.316	-0.0001	0.000	0.002
	(-0.51)	(1.15)	(0.05)	(-0.84)	(-1.76)*	(0.04)	(1.25)
Average Bank Months	0.007	0.000	-0.000	-0.370	0.0002	-0.000	-0.009
	(0.69)	(1.72)*	(-0.72)	(-0.28)	(1.67)	(-0.70)	(2.07)**
Guarantee	1.593	-0.020	-0.017	-76.191	0.021	0.073	1.817
	(0.93)	(-0.78)	(-2.45)**	(-0.29)	(0.62)	(1.76)*	(2.08)**
Differentiated Inputs	11.587	0.286	-0.006	5,930.512	0.169	-0.910	1.105
	(0.82)	(0.65)	(-0.12)	(1.87)*	(0.62)	(-1.25)	(0.19)
Service Inputs	-61.749	-1.039	-0.242	-7,381.735	-0.001	1.653	-5.241
	(-3.20)***	(-2.96)***	(-2.33)**	(-1.59)	(-0.00)	(2.15)**	(0.60)
Retail	10.486	0.159	0.093	698.391	-0.011	-0.358	1.829
	(2.20)**	(2.60)***	(3.63)***	(1.33)	(0.21)	(-3.68)***	(2.44)**
Wholesale	9.947	0.167	0.089	1,128.090	0.104	-0.217	-0.239
	(3.77)***	(3.78)***	(3.38)***	(1.85)*	(2.24)**	(-2.01)**	(-0.10)
Number of Suppliers	-0.218	0.032	0.000	6.773	0.004	-0.004	0.642
	(-0.33)	(3.99)***	(0.14)	(0.08)	(0.32)	(-0.28)	(2.11)**
Input Concentration	4.340	0.038	0.073				
	(0.33)	(0.12)	(1.11)				
Inventories/Sales						0.017	0.538
						(2.90)***	(1.70)*
Obs.	2260	2271	2273	1179	2256	2274	2271
R-squared					0.02		

Table 4. Payables and payment behavior

All dependent and independent variables are defined in Table 1. Constants are included in all regressions but parameter estimates are not reported. In Column (1), 59 two-digit SIC indicators are also included. In Columns (1) to (6), parameters are estimated by ordinary least squares. In Column (4), estimates are obtained using a probit model, and we report marginal effects, calculated by taking the mean of all independent variables, instead of parameter estimates. In Column (1), the coefficient of payables turnover is multiplied by 100. Numbers in parentheses denote t-values. Standard errors are White-corrected for heteroskedasticity. * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level.

	(1) Cost of Inputs/Sales	(2) Payables/Assets	(3) Late Fraction	(4) Late Dummy	(5) Payables Turnover	(6) Discount Usage
Purchases on Account		0.021	0.051	0.001	0.947	-0.030
		(1.87)*	(1.48)	(2.14)**	(1.01)	(-0.48)
Payables Turnover	-0.004					
	(-3.97)***					
Due Dates		0.007	0.024	0.002	4.496	
		(0.32)	(0.38)	(2.89)***	(2.41)**	
Penalty Size		0.002	0.064	-0.006	80.193	
		(0.01)	(0.15)	(-1.22)	(6.38)***	
SOD		-0.005	0.012	0.000	-0.387	0.010
		(-0.51)	(0.40)	(1.43)	(0.45)	(0.20)
Discount Size						15.030
						(1.71)*
Discount Period						3.297
						(1.07)
Fear of Denial	0.006	-0.850	9.632	0.234	159.289	-15.243
	(0.06)	(-0.97)	(4.11)***	(8.35)***	(2.13)**	(-3.21)***
Financial Problems	-0.068	0.076	3.129	0.072	-23.680	-20.451
	(0.91)	(0.07)	(1.18)	(2.03)**	(0.26)	(-3.57)***
Profit/Sales		0.016	0.519	0.003	4.844	-1.957
		(0.16)	(1.24)	(1.17)	(0.56)	(-3.06)***
Log Assets	-0.011	-0.821	-0.259	0.024	18.515	-2.171
	(0.27)	(-5.00)***	(-0.53)	(4.40)***	(1.32)	(-2.32)**
Log Age	-0.020	0.205	-1.191	-0.005	21.183	2.658
	(0.35)	(0.42)	(-0.84)	(-0.32)	(0.51)	(1.04)
Credit Line	0.000	0.000	-0.000	0.000	0.000	-0.000
	(1.21)	(1.19)	(-2.54)**	(1.81)*	(0.61)	(-0.23)
Other Loans/Sales	0.402	-0.021	-0.897	-0.009	-9.061	-1.342
	(2.31)**	(-0.06)	(-1.56)	(-0.80)	(0.31)	(-0.32)
Average Bank Distance	0.000	0.000	0.001	0.000	-0.052	-0.009
	(0.36)	(0.22)	(0.28)	(1.13)	(0.53)	(-1.39)
Average Bank Months	-0.000	0.001	0.029	0.000	-0.179	0.060
	(0.57)	(0.19)	(1.67)*	(2.39)**	(0.45)	(3.02)***
Employees	0.000					
	(0.12)					
Obs.	3282	2271	1045	2271	2266	623
R-squared	0.03	0.01	0.03		0.02	0.09

Appendix

The industry classification is based on Rauch (1999). Differentiated Inputs is the share of inputs that comes from sectors producing differentiated products. Service Inputs and Standardized Inputs are defined analogously. The sum of service inputs, standardized inputs, and differentiated inputs is 1.

Sector	SIC code	Services	Differentiated Goods	Standardized Goods	Service Inputs	Differentiated Inputs	Standardized Inputs
Manufacturing							
Coal mining	12	0	0	1	0.25	0.24	0.52
Non metallic minerals	14	0	0	1	0.22	0.20	0.57
Food, kindred products	20	0	0	1	0.27	0.18	0.55
Textile mill products	22	0	0	1	0.45	0.15	0.40
Apparel	23	0	0	1	0.31	0.21	0.48
Lumber, wood products	24	0	0	1	0.43	0.17	0.40
Furniture, fixture	25	0	1	0	0.28	0.17	0.55
Paper, allied products	26	0	0	1	0.19	0.21	0.60
Printing publishing	27	0	1	0	0.07	0.20	0.73
Chemicals	28	0	0	1	0.41	0.22	0.36
Petroleum, coal products	29	0	0	1	0.20	0.20	0.59
Rubber, plastic products	30	0	1	0	0.31	0.18	0.50
Leather	31	0	0	1	0.14	0.17	0.70
Stone, glass, clay products	32	0	1	0	0.30	0.22	0.48
Primary metal industries	33	0	0	1	0.38	0.30	0.32
Fabricated metal products	34	0	1	0	0.50	0.25	0.25
Machinery	35	0	1	0	0.46	0.18	0.36
Electrical, electronic equipment	36	0	1	0	0.34	0.17	0.50
Transportation, equipment	37	0	1	0	0.56	0.22	0.22
Instruments	38	0	1	0	0.19	0.16	0.65
Miscellaneous products	39	0	1	0	0.23	0.20	0.57

Transportation, communication, public utilities							
Other surface passenger transportation	41	1	0	0	0.12	0.26	0.62
Motor freight transportation, warehousing	42	1	0	0	0.07	0.42	0.51
Water transportation	44	1	0	0	0.10	0.53	0.37
Air transportation	45	1	0	0	0.15	0.30	0.54
Transportation services	47	1	0	0	0.12	0.26	0.62
Communications	48	1	0	0	0.06	0.37	0.57
Electric, gas, sanitary services	49	1	0	0	0.03	0.23	0.74
All wholesale trade							
Durable goods	50	1	0	0	0.08	0.28	0.64
Non-durable goods	51	1	0	0	0.08	0.28	0.64
All retail trade							
Building materials	52	1	0	0	0.09	0.29	0.62
Department stores	53	1	0	0	0.09	0.29	0.62
Food stores	54	1	0	0	0.09	0.29	0.62
Automotive	55	1	0	0	0.09	0.29	0.62
Apparel, accessory stores	56	1	0	0	0.09	0.29	0.62
Furniture	57	1	0	0	0.09	0.29	0.62
Miscellaneous retail stores	59	1	0	0	0.09	0.29	0.62
Drug and proprietary stores	61	1	0	0	0.03	0.39	0.58
Finance, insurance, real estate							
Insurance agents, brokers	64	1	0	0	0.04	0.56	0.41
Real Estate	65	1	0	0	0.08	0.23	0.69
Other services							

Business services	73	1	0	0	0.15	0.30	0.55
Automobile repair, services, parking	75	1	0	0	0.26	0.25	0.49
Legal services	78	1	0	0	0.09	0.38	0.53
Com. Engineering, accounting, research	79	1	0	0	0.09	0.38	0.53