What You Sell Is What You Lend?

Explaining Trade Credit Contracts.[*]

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Abstract

Relating trade credit volumes and contract terms to different product characteristics and aspects of bank-firm relationships, we 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 of services seem to have larger account receivables than do suppliers of standardized goods. Second, trade credit seems to convey favorable information to other lenders. Firms financed with trade credit have shorter relationships with more distant and numerous banks. Third, a majority of firms in our sample appears to receive all the trade credit at no cost. Additionally, firms that are more creditworthy and have some buyer market power receive larger discounts.

JEL CLASSIFICATION: G32.

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I   Introduction

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 that prove helpful in assessing the relative importance of different trade credit theories. First, we show how trade credit usage is correlated not only with the buyer'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.

Relating trade credit to the nature of the inputs and banking relationships enables us to uncover three novel empirical regularities.

(i) 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 account receivables than do suppliers of standardized goods. Service suppliers also offer cheaper trade credit for longer periods, and are less likely to refuse lending on the basis of the buyer's creditworthiness.

This first set of results demonstrates the empirical relevance of theories that attribute trade credit - implicitly or explicitly - to product characteristics. These explanations have in common that the products sold on credit are not homogeneous off-the-shelf goods, but emphasize quite different economic mechanisms. First, differentiated goods, being more often tailored to the needs of particular customers, can be redeployed better by the original supplier than other lenders following buyer default. Hence, these goods should be sold on credit (Frank and Maksimovic, 2004; Longhofer and Santos, 2003). Second, buyers are less tempted to upset a unique supplier than a supplier that is easily replaced. Therefore, suppliers of differentiated products may be better protected against buyer opportunism than arguably easier to replace suppliers of homogeneous products (Cunat, 2003). Third, differentiated products are more difficult to divert for unintended purposes. Resale revenues may be low because it may be hard to identify suitable buyers and there is no reference price. This should again contribute to shield suppliers against buyer opportunism (Burkart and Ellingsen, 2004). Fourth, differentiated products tend to have more quality variation, and the buyer

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[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).

may be reluctant to pay before having had time to inspect the merchandise (Smith, 1987).[2] By contrast, standardized goods can by definition be used by many different customers. Due to their wide-spread use, these goods command a market price and can therefore be easily diverted or sold by agents other than the original producer. Moreover, their quality is also quickly assessed.

The finding that service suppliers offer cheaper trade credit for longer periods is consistent only with theories based on lender or borrower opportunism. Service providers may be hard to replace, provide an input that is virtually impossible to divert and whose quality may be difficult to ascertain. However, services have no collateral value. We also find that suppliers' reputation does not affect the propensity to offer trade credit. This leads us to conclude that theories based on borrower opportunism best explain the observed relation between product characteristics and trade credit patterns.

(ii) Trade credit seems to convey favorable information to other lenders. After controlling for firm creditworthiness, firms that take 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 that consequently gather limited information about their businesses (e.g., Degryse and Ongena, 2004 and Von Thadden, 1995). Hence, a plausible interpretation of this finding is that the 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) hypothesis that the extension of trade credit reveals favorable information to other lenders, thereby increasing their willingness to lend.

This finding also suggests that suppliers' informational advantage differs in nature from the one of relationship banks. A bank-firm relationship confers an informational monopoly to the bank that restricts the firm's ability to secure funding from other sources. By contrast, trade credit seems to give rise to a positive informational externality, thereby facilitating access to other lenders.

(iii) 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

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[2]See also Lee and Stowe (1993), and Long, Malitz and Ravid (1993).

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 is the predominant cost of trade credit, as suggested by previous literature (Petersen and Rajan, 1994), this means that these firms receive trade credit at zero cost. Hence, it seems safe to conclude that most trade credit on their balance sheets is cheaper than bank credit.[3] This finding goes against the common view that trade credit is primarily a last resort for firms that are running out of bank credit.

We also find that large firms receive more discounts. Since large firms are arguably less risky, these discounts are unlikely to capture a risk premium charged by suppliers. 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 finding suggests that buyer market power may affect 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 the 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 various 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.

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, the stronger

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[3]Costly trade credit appears on a buyer's balance sheet only when an early payment discount is offered and the buyer refrains from utilizing it.

reliance on trade credit during recession (Nilsen, 2002) suggests that trade credit is relatively plagued by agency problems.

Our work is also related to a growing literature that studies the determinants of contract terms in different contexts (e.g., Kaplan and Strömberg, 2003; Berger and Udell, 1995). Besides studying the contract terms 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 II provides the theoretical background and derives the hypotheses. Section III describes the data and provides summary statistics. Sections IV, V and VI report our results on trade credit volume, contract terms and usage. Section VII concludes.

II   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 the empirical relevance of different theories. 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. In particular, it is beyond the scope of our paper to test theories based on imperfect competition, as full tests of these theories would require observing input prices and exchanged quantities.

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 the 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.

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

A 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.

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 $L_i(L)$ 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

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

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. 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; Longhofer and Santos, 2003).[5] This comparative advantage is more pronounced for differentiated goods because these are often tailored to the needs of few customers. Knowing their customer base suppliers can re-sell the good at higher price (*collateral hypothesis*).[6] In

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[5] The supplier's repossession advantage also depends on priority rules and bankruptcy laws. While trade credit is generally junior debt, a secured trade creditor can reclaim any good that has not been transformed from a bankrupt firm. For instance, in the U.S., suppliers can seize the goods sold to an insolvent buyer even when the firm is not under the bankruptcy procedure (Garvin, 1996).

[6] Eisfeldt and Rampini (2006) attribute leasing to the fact that leased capital is more easily repossed in bankruptcy than secured debt..

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 entrepreneur is more likely to repay him than to repay the bank. Cunat (2003) 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*). To the extent that differentiated goods and services are tailored to the needs of the buyer, it may be more difficult to switch supplier. In addition, suppliers may be less susceptible to the risk of strategic default because inputs are less liquid and thus less easily diverted than cash (Burkart and Ellingsen, 2004). Accordingly, defaults related to diversion of corporate resources are less likely if the supplier grants the loan (*diversion hypothesis*). Differentiated products and (to a larger extent) services are harder to divert than standardized products and may therefore be associated with more trade credit.

3. *Informational advantage; $A_S > A_B$.* Although banks gather information to assess the credit-worthiness of potential borrowers, a supplier may sometimes have access to superior information (e.g., Biais and Gollier, 1997; 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*).

4. *Imperfect competition; $L_S < L_B$.* The supplier's opportunity cost can sometimes be considerably smaller than those 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 cus-

tomer characteristics to explain why suppliers offer trade credit and early payment discounts instead of engaging in other forms of price discrimination (*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 customers in temporary financial distress because his own prospects depend on the customers' survival.

Our simple framework fails to accommodate some trade credit theories, notably explanations based on product quality considerations (Smith, 1987; Lee and Stowe, 1993; 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 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 would be the creditor.

B   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 a 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

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

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] Furthermore, 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. In this case, the buyer has little incentive to repay prior to the due date as the repayment remains D_2 over the entire period $(t_1, t_2]$.

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

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

The cost of forgoing early payment discounts often implies a very high annualized interest rate.[8] On average, the actual cost is 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, tend 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, as suggested by the switching cost and the diversion hypotheses, should offer cheaper loans. Hence, these theories predict that product characteristics are related to the cost of trade credit in

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[7] We consider payments after the due date t_2 to be contract violations. Alternatively, 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%.

a similar fashion as is the willingness to sell on credit in the first place.[9]

To the extent that firms have some financial slack or unused credit facilities enabling them to take advantage of the 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. For example, 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 any great extent.[10]

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). Hence, suppliers' potential liquidation advantage vanishes after ten days.

Finally, financial contracting theories emphasize that short(er) maturity is a means for lenders to obtain control, thereby mitigating borrowers' 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.

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

[10] As a rule of thumb, U.S. banks are willing to give short-term loans up to about eighty percent of the value of the receivables (Mian and Smith, 1992). Therefore, only about twenty percent of the receivable crowds out other investments by the supplier.

III Data and descriptive statistics

A 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 information that goes well beyond balance sheet items and is regarded 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 (see, for instance, Elliehausen and Wolken, 1993; Petersen and Rajan, 1997), the role of lending relationships and credit availability to small businesses (Petersen and Rajan 1994, 1995; Berger and Udell, 1995; Berger et al., 2005).

From the NSSBF we obtain information on account payables, account receivables, 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 sectoral disaggregation. We run a robustness check using the 2001 Compustat data that allows us to identify industries at the four-digit SIC level. Due to data limitations, this robustness test can, however, be performed only for the account receivables. In the rest of the analysis, the coarse two-digit sectoral classification is bound to lead to measurement errors, thereby biasing our estimates against finding any results. Consequently, our positive results can only 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). Remaining sectors are

classified as *services*. In the Appendix we provide the complete list assigning each industry to one of the three product classes.

Because of their reference price, standardized goods can be sold as easily by its producer as by any other agent. In contrast, differentiated products are likely to be tailored to the need of a limited number of customers. Suppliers, knowing the needs of different customers, are likely to be able to sell these products at a higher price.[11] Services are often customized, with no collateral value and impossible to divert.

Each product category includes rather disparate sectors. For instance, accountants and food stores are both classified as services. This makes it unlikely 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 may straightforwardly investigate whether the amount of trade credit that a firm *extends* depends on the nature of the product. Clearly, the ability to *receive* trade credit also depends on product characteristics. 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.

We control for sectoral 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 (2001)

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[11] 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 is unlikely that a large proportion of differentiated products has an unique potential user.

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

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.

B   Sample Firms

The 1998 NSSBF covers 3561 firms. As the available information is not complete for all firms, our final sample includes 3489 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$ four million in sales and less than US$ two million in assets.

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 extension of and access to trade credit as our subsequent analysis shows. Using the 1993 NSSBF data, Berger et al. (2005) document that differences in size (and accounting records) also affect the nature of the bank-firm relationship and the availability of bank credit.

[INSERT TABLE 1 HERE]

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 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 presents the industry specific proxies that we have constructed. It suggests that firms producing standardized products operate in more concentrated sectors and also use inputs from relatively more concentrated sectors. The input-output matrices are also useful because they include

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[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.

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 theories based on the informational advantage of suppliers.

C   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 have to 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 from purchases but not from sales, so we can examine the contract terms only from the customers' perspective.

C.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. 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 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 ought to rely less on trade credit financing, and their suppliers ought to have less receivables.[14]

Another source of bias stems from the fact that the demand for trade credit facing a firm is

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[14]The amount of receivables that a supplier holds also depends on whether or not it sells its receivables to a third party, i.e., uses factoring. To the extent that factoring is used, receivables underestimate the amount of credit that is available to firms in connection with input purchases. In unreported regressions, we control for the firms' use of factoring. The coefficient of this dummy variable is never significant. Thus factoring is unlikely to significantly bias our variable of interest.

affected by a variety of customer characteristics that again 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 shows that firms in sectors 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 account receivables to sales ratio. Provided that these variations persist after controlling for firm characteristics – which may not be the case as firms in the service sectors appear systematically smaller – this would indicate that the collateral value of the product matters for the firms' willingness to sell on credit.

Panel C also includes the terms of credit offered by suppliers in different sectors, 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 suggests that service firms appear to grant their customers an almost equally long payment period as producers of differentiated goods. Moreover, service firms 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 sectors. In general, it confirms that analyzing contract terms as well as volume allows for a more complete interpretation of the evidence.

C.2 Buyers' perspective

Volume Firms participating in the 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 percent of all firms report that they never purchase on account, whereas almost 20 percent 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 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 reveals that the amount of trade credit offered to our sample firms differs across sectors. Service firms in particular seem to receive less trade credit.

Other contract terms   Firms also report the terms at which their suppliers offer trade credit. This enables us to study the terms of trade credit from the point of view of the buyer. 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 late payment penalty. Additionally, firms are asked whether they used cash discounts and whether they paid after the due date.

The duration of trade credit   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 also a measure of trade credit duration as well.

The NSSBF 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

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is due.

Panel D shows that on average, trade credit is due in about 25 days, with providers of standardized inputs offering longer payment periods. More than 70 percent of the firms however 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.

Early payment discounts   Panel D also shows that only about 20 percent of the suppliers offer discounts. Even more strikingly, seventy percent of the most important suppliers do not offer discounts. Among the firms that are offered discounts, only ten percent receive discount offers from all their suppliers. 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 percent) obtains a discount when paying within ten days. This is again consistent with the findings of Ng, Smith and Smith (1999). However, like the other contract terms, the length of the discount period is not an entirely rigid parameter. For the remaining firms, longer discount periods are more common than shorter.

As has been noted in previous studies (Petersen and Rajan, 1995; Ng, Smith and Smith, 1998), the most common discount terms is two percent discount for payment within ten days. The discount size is, however, not an entirely fixed parameter. In our sample, 10 percent of firms receive discounts of less that 1 percent or more than 5 percent. 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 an even a larger variation in discount sizes. Standardized product suppliers offer 50 percent larger discounts than differentiated product suppliers. This suggests that the latter may have a

comparative advantage in mitigating financial markets imperfections.

To compare the cost of trade credit with the cost of other sources of funding, we calculate the annualized cost of trade credit, similarly to Petersen and Rajan (1994), but taking into account that trade credit typically has some interest free period (discount period). Because of this correction and the large proportion of firms not being offered discounts, we find that the average annualized trade credit interest rate is 28 percent. However, a quarter of the firms can borrow from suppliers at an interest rate that is less than 13 percent 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 percent.

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

Relation between contract terms Finally, Panel E shows that the correlations between the various contract terms offered are low and only a few are statistically significant at the 10 percent 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.[15]

C.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 shows that more than half of our sample firms use trade credit. Among those firms, almost half paid at least one of their bills after the due date, and the fraction of input purchases paid late exceeds 10 percent. The use of discounts is negatively related to the use of trade credit as a source of funding, suggesting that at least some of the 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.

IV 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 sectors: In the case of receivables, this is firm's output 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 standardized goods, differentiated goods, and services that the firm employs in production. We control for proxies of firms' access to internal and external funds, creditworthiness and industrial structure.

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[15]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.

Panel A and B of Table 2 present our results for the ratio of account receivables 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 the industry fixed effects.[16] In all cases, errors are clustered at the sectoral level, since 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]

A 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 greater availability of funds in these sectors 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 the finer four-digit SIC disaggregation and include much larger (with an average total assets of over US$ 5 million) firms. The consistency of the results for the receivables across the two datasets increases our confidence that the subsequent findings are unlikely to be driven by the coarse two-digit SIC classification.

Panel B confirms this finding from the buyer's point of view. Firms that buy a larger fraction of differentiated products can make more purchases on account (Column 2). Additionally, firms buying a larger fraction of differentiated products are more likely to be offered and hence use 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, the evidence is consonant with the collateral liquidation hypothesis.

Other findings are difficult to reconcile with the collateral hypothesis. First, the hypothesis implies that suppliers of differentiated inputs should lend relatively more when the probability of

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[16]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.

having to redeploy the input is higher. Yet, Panel B (Column 3) shows that firms close to financial distress 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 financially distressed firms than other suppliers. This casts doubt on the hypothesis that suppliers' comparative advantage in lending derives directly from the lower cost of redeploying the traded product. Even if it is only weakly correlated with the probability of non-strategic default, a liquidation advantage strengthen the credibility of the repossession threat, thereby deterring strategic default.[17]

Second, 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 firm heterogeneity, i.e., by the fact that service firms are on average smaller and thus have a lower debt capacity.)[18] This finding cannot be explained by the collateral hypothesis because services have no collateral value.

B   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 supplier 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 sectors trade highly liquid final products.

Panel B of Table 2, however, provides conflicting evidence. Firms that buy relatively more services receive *less* trade credit from their suppliers (Column 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

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[17]Hart and Moore (1994) explore the role of collateral in preventing strategic default in a generic borrower-lender model.

[18]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.

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. Interestingly, in contrast 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). 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. In unreported estimates, we find that service providers are less likely to deny credit because of concerns about customers' repayment ability.[19]

It is difficult to further evaluate why suppliers may be able to mitigate borrower moral hazard –if at all. If older firms have established more long-term 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. Yet, older firms seem to receive more trade credit (Panel B of Table 2). 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 long-term relationships improve access to trade credit.

C   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 (Table 2, Panel A). 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. Third, producing the input may involve learning about the customer, notably providing information-

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[19]In contrast, providers of differentiated goods deny credit for this reason.

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.

While this evidence does not support 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.

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 (producing) additional information about the borrower. Using the NSSBF, we measure the quality of the banks' information about a given firm by the average number of months that a firm did business with its banks and by the average distance between it and its banks. Based on the available evidence in the banking literature (e.g., Degryse and Ongena, 2004), our presumption is that closer banks and banks with a longer relation have accumulated more information about the firm.

We find that firms that are offered trade credit, as captured by the dummy trade credit usage, on average have 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.[20] The estimates in Panel C of Table 2 show that firms that are offered trade credit have a larger number of banks. Thus, observing suppliers offering trade credit seems to reduce banks' returns to information collection. Additionally, firms that receive trade credit pay lower fees for obtaining a bank loan. A possible interpretation is that the extension of trade credit is an observable positive signal about the firm's creditworthiness, intensifying competition among banks. However, other loan characteristics, such as the interest rate on the loan and its maturity

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[20]Carletti (2003) provides a theoretical justification.

do not seem to be related to the supplier decision to extend trade credit.[21]

Overall, these findings suggest that suppliers have an information advantage that is not industry but customer specific. Moreover, the informational advantage seems to benefit the borrower's relationship with other lenders. This leads us to conjecture that suppliers' informational advantage differs in its nature from the one of relationship banks. In fact, the literature on relationship banking emphasizes how close relationships with one bank may hinder the prospects for borrowing from other banks (Sharpe, 1990; Rajan, 1992).

D   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 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 companies 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.

Arguably, suppliers may be a kind of relationship lenders, similar to banks. In our view, it is unlikely that our product classification proxies capture systematic differences in the supplier-customer relationships across different industries. The NSSBF data allow us to further check with possibility. Firms can state "lack of relationship" as one of the reasons why their main suppliers has denied trade credit. We find that buying a larger proportion of services or differentiated products is not related to the probability that lack of a relationship is the stated reason (estimates not reported). Interestingly, older firms are more likely to be denied trade credit because they lack a relation with their main supplier.

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[21] We cannot reject the competing hypothesis that banks and suppliers both have different private information about creditworthiness. However, the reported effects are largely unaffected by the inclusion of the credit risk variable.

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.[22] 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 percent). 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. 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 (Panel A of Table 2, Column 4). Product characteristics and payment practices are highly correlated since they vary across sectors but not across firms within sectors. 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 sectors – 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 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 use trade credit. A possible interpretation is that sellers have an incentive to lend to financially distressed buyers, as proposed by Wilner (2001).

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

Finally, we note that large firms, firms operating in concentrated sectors and, especially, firms with many customers can make significantly more purchases on account. These findings indicate that suppliers are more generous in providing trade credit to customers that have more bargaining power. A challenge for future theoretical work is to explain why sellers do not simply lower the price to these customers instead.

V   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. Table 3 documents our results for the various contract terms from the buyer's perspective.

[INSERT TABLE 3 HERE]

We find that firms buying a larger proportion of services have a smaller proportion of suppliers offering discounts (Column 1), 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 and receive trade credit at lower cost, although the coefficient in the regression 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.[23] It is 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 (Column 1, 2, and 3) and shorter discount periods (Column 6), and wholesalers face larger penalties for late payment. Since

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[23]In unreported regressions, we find that the proportion of services used as input is not related to the interest rate on bank loans.

wholesaler and retailer trade highly liquid final products, these findings suggest that the ability of mitigating borrower opportunism contributes to shape trade credit contracts. Furthermore, as wholesale and retail firms purchase finished highly liquid products, but should not necessarily have higher switching costs than other firms, these estimates favor the diversion hypothesis. However, retail firms are offered longer payment periods than other buyers (Column 5), and this finding contradicts the diversion hypothesis.

Firms buying more differentiated goods receive trade credit at a higher cost (Column 4). 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.

We find no evidence that buying inputs from more concentrated sectors is related to higher discounts. It seems that 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 sectors.

Larger firms receive larger discounts, but for shorter periods. Perhaps, discounts encourage early payment only 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 represent favorable treatment due to larger bargaining power. The latter interpretation is consistent with the fact that larger firms are charged smaller penalties for late payment (Column 5) and firms with many suppliers are more likely to be offered discounts (Column 2).

We find that 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. To the extent that inventories capture untransformed inputs, this finding is consistent with the collateral and the diversion hypotheses. Both tie maturity to the time it takes to transform the input.

Surprisingly, 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. Our interpretation is that discounts are a poor proxy for the risk premium that suppliers charge to firms with low creditworthiness. Possibly, suppliers anticipate that inducing early repayment from firms in 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.

Overall, our findings challenge the view that contract terms vary across industries but not within industries[24] and suggest that they are an important component of the suppliers' decision to offer trade credit.

VI   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.[25] 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 included different and less judiciously chosen contract characteristics. Their coefficients are insignificant.

[Insert table 4 here]

The extent to which firms use trade credit depends on the purchases that they are able to make on account. 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 (Column 1). Consistently 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 in financial distress pay a larger fraction of their trade credit late and are more likely to pay after the due date (Columns 2 and 3). More surprisingly, firms with longer bank

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

[25]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.

relationships, which arguably should have easier access to bank credit, and large firms are also more likely to pay late. One possible explanation is that suppliers do not enforce late penalties for firms with good payment records and 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; Ng, Smith and Smith, 1999). Weak contract enforcement may also explain why higher penalties do not significantly induce more timely repayment. In addition, firms with a longer payment period are more likely to pay after the due date. This is in agreement with our previous findings that suppliers tend to be lenient towards customers with bargaining power.

Column 4 documents how firms respond to financial incentives. A larger discount increases the likelihood that a firm takes advantage of the discount offer. Firms are more likely to forgo discounts if they fear to be denied bank loans or are in financial distress. Similarly, firms with longer bank firm relationships are more likely to take advantage of discounts. This is again consistent with Petersen and Rajan (1994) who find that financially constrained firms with less access to bank loans are less likely to take advantage of early payment discounts. In addition to be 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 we analyzed in the previous section: They take cheap trade credit when they get it and utilize costly trade credit when they must. Furthermore, 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.

VII   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 trade credit at zero cost. Firm-specific characteristics, possibly capturing customer bargaining power, affect contract terms (even for firms within the same sector), 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. Presumably, all trade credit contract terms are jointly determined. 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 which 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.

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Table 1. Descriptive Statistics
Panel A: Firms Characteristics

Assets are in million of dollars, Age is in year, and Sales are in million of dollars per year. Credit Line is the bank credit limit on the firm's overdraft facility divided by sales. Other Loans includes 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. Distress 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 Banks Months is the average number of months of the firm relationship with its banks. Guarantee is a dummy variable that takes the value 1 if the firm had to provide guarantees on its last loan and zero otherwise. Last Loan Interest Rate is the annualized interest rate on the last loan received by the firm in percentage points. Fee is the total dollar cost of obtaining the 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	2.46	3.91	1.06
	(5.374)	(7.97)	(9.50)	(3.95)
Age	14.46	16.30	16.70	13.87
	(12.15)	(12.68)	(13.36)	(11.86)
Sales	3.473	6.03	5.74	2.78
	(15.1)	(31.0)	(1.07)	(10.2)
Profit/Sales	-0.040	0.028	-0.069	-0.049
	(4.94)	(1.23)	(1.67)	(5.54)
Fixed Assets/Total Assets	0.30	0.32	0.32	0.29
	(0.31)	(0.30)	(0.26)	(0.31)
Inventories/Sales	0.14	0.11	0.21	0.13
	(0.13)	(0.57)	(0.72)	(0.66)
Credit Line	0.14	0.09	0.14	0.15
	(1.66)	(0.22)	(0.55)	(1.87)
Other Loans/ Sales	0.09	0.03	0.14	0.09
	(0.97)	(0.12)	(1.02)	(1.05)
Credit Risk	2.98	2.91	2.89	3.00
	(1.04)	(1.12)	(1.22)	(1.01)
Fear of Denial	0.22	0.23	0.20	0.23
	(0.42)	(0.42)	(0.40)	(0.42)
Distress	0.12	0.15	0.12	0.11
	(0.32)	(0.36)	(0.33)	(0.31)
Unused Credit	2.76	1.04	0.83	3.54
	(45.30)	(3.30)	(3.28)	(54.21)
Number of Banks	2.44	2.54	2.87	2.37
	(1.71)	(1.73)	(2.11)	(1.65)
Average Bank Distance	148	131	167	149
	(286)	(232)	(309)	(292)
Average Bank Months	86	92	84	86
	(80)	(84)	(69)	(80)
Guarantee	0.50	0.60	0.64	0.46
	(0.50)	(0.49)	(0.48)	(0.50)
Last Loan Interest rate	11	12	7.2	12
	(36)	(33)	(28)	(38)
Fees	10649	36208	16137	3639
	(139735)	(328031)	(71848)	(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 firm in the same industry.

Sector Characteristics	Means (Standard Deviations)			
	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 is the number of days in 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).

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

Table 1. Descriptive Statistics
Panel D: Buyers' perspective

Account Ratio 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. Due Date is the mean due date 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 follows

$$\left(1+\frac{Discount\ Size}{100-Discount\ Size}\right)^{\frac{365}{DueDate}}-1;$$ 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.

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

Trade Credit Usage is a dummy variable that takes the value 1 if the firm used trade credit during the past 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	0.59	0.06	0.19	0.38
	(13.19)	(33.62)	(0.53)	(4.01)
Trade credit Usage	0.66	0.80	0.84	0.62
	(0.47)	(0.40)	(0.36)	(0.49)
Discount Usage	0.57	0.60	0.45	0.59
	(0.44)	(0.45)	(0.44)	(0.44)
Late Dummy	0.46	0.48	0.55	0.44
	(0.50)	(0.50)	(0.50)	(0.50)
Late Fraction	0.14	0.16	0.15	0.13
	(0.26)	(0.29)	(0.24)	(0.26)

Table 2. The Volume of Trade Credit
Panel A: Suppliers' Perspective

The dependent variable is the ratio of account receivables 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 firm's 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 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. Errors are clustered at the sectoral level.

	(1)	(2)	(3)	(4)
			Compustat	
Log Assets	0.02	0.02	0.03	0.02
	(6.89)***	(5.56)***	(2.70)***	(4.93)***
Profit/Sales	-0.01	-.002	0.00003	-0.004
	(-0.21)	(-0.51)	(3.15) ***	(-0.32)
Fixed Assets/Total Assets	-0.15	-0.13	-0.02	-0.11
	(-4.35)***	(-4.77)***	(-3.27)***	(-3.89)***
Log Age	-0.01	-0.01		-0.001
	(-1.73)*	(-0.93)		(-0.17)
Credit Line	0.01	0.002		0.002
	(0.81)	(0.44)		(0.16)
Other Loans/ Sales	0.02	0.02		0.02
	(1.91)*	(1.82)*		(1.57)
Credit Risk	0.01	-.00003		0. 0001
	(0.90)	(-0.01)		(0.01)
Average Bank Distance	-.00003	-.00002		-0.00002
	(-2.21)***	(-2.26)**		(-1.58)
Average Bank Months	.0001	.000048		0.00002
	(1.68)*	(1.12)		(0.50)
Same Area	-0.03	-0.01		-0.02
	(-1.16)	(-1.16)		(-2.04)**
Differentiated Goods		0.05	0.02	
		(2.40)**	(2.58)***	
Services		0.04	0.03	
		(2.34)**	(3.25)***	
Retail		-0.06	-0.04	
		(-2.33)**	(-3.67)***	
Wholesale		-0.1	-0.12	
		(-5.77)***	(-10.25)***	
Own Concentration		-.0003	0.00003	-.0004
		(-0.43)	.27)	(-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 the (Diff Inp) x Distress, which interacts the Differentiated Inputs dummy with the Distress dummy. Constants are included in all regressions but are not reported. In Column (1), 59 two-digit SIC indicators are also included. In columns (1), (2) and (5), the dependent variable is the percentage of purchases made on account, and parameters are estimated by ordinary least squares. In Columns (3), the dependent variable is a dummy equal to 1 if the firm uses trade credit and zero otherwise. In Column (4), the dependent variable is a dummy equal to 1 if a firm using trade credit has been denied trade credit and equal to zero otherwise (firms that do not use trade credit are not included). In Columns (3) and (4), estimates are obtained using a probit model, and we report marginal effects, calculated by taking the mean of all independent variables, instead of parameters' estimates. Numbers in parentheses denote t-values. Errors are clustered at the sectoral 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
Log Assets	5.04 (11.45)***	5.46 (11.62)***	5.624 (11.55)***	0.05 (9.19)***	-0.007 (-2.52)**	-0.70 (-2.67)**
Profit/Sales	-0.12 (-0.81)	0.16 (0.40)	-0.722 (-1.75)*	-0.02 (-2.06)**	0.008 (2.07)**	-0.32 (-1.47)
Fixed Assets/Total Assets	-3.05 (-0.97)	-3.31 (-0.88)	-2.982 (-0.85)	-0.03 (-0.78)	-0.002 (-0.09)	2.74 (1.26)
Log Age	3.01 (2.78)***	0.16 (0.40)	2.914 (2.27)**	0. 03 (1.86)*	-0.021 (-2.00)**	-0.42 (-0.60)
Credit Line	-0.22 (-1.74)*	-0.48 (-1.12)	-0.957 (-1.64)	-0.02 (-1.57)	0.003 (0.29)	-0.35 (-1.46)
Other Loans/ Sales	0.12 (0.20)	-0.02 (-0.03)	-0.050 (-0.07)	-0.003 (0.35)	-0.002 (-0.30)	0.57 (1.03)
Credit Risk	-1.66 (-2.53)**	-1.39 (-1.69)*	-1.129 (-1.40)	-0.004 (-0.33)	0.037 (4.67)***	-1.02 (-1.99)*
Average Bank Distance	0.001 (0.51)	0.0002 (0.08)	0.000 (0.10)	0.000 (1.76)	0.000 (0.43)	-0.04 (-2.40)**
Average Bank Months	-0.01 (-0.88)	-0.02 (-1.57)	-0.957 (-1.64)	-0.000 (2.75)***	-0.000 (-0.38)	-0.01 (-0.86)
Guarantee	6.01 (2.99)***	4.83 (2.23)***	5.533 (2.57)**	0.074 (3.49)**	0.007 (0.52)	-0.44 (-0.34)
Differentiated Inputs		32.10 (1.93)*	-0.050 (-0.07)	0.57 (2.36)**	-0.014 (-0.15)	23.94 (2.17)**
Service Inputs		-58.29 (-2.83)***	-59.052 (-2.63)**	-0.57 (-1.71)*	-0.218 (-1.94)*	-17.45 (-1.43)
Distress			-1.505 (-0.60)			
(Diff Inp) x Distress			-64.276 (-1.90)*			
Retail		11.04 (3.78)***	11.6 (3.86)***	.04 (1.01)	0.029 (2.25)**	7.27 (3.71)***
Wholesale		9.38 (3.87)***	9.88 (3.81)**	0.10 (3.62)***	0.004 (0.31)	3.58 (2.30)**
Own Concentration		0.23 (2.92)***	0.26 (3.06)***	0.001 (1.12)	0.013 (2.31)*	0.04 (0.86)
Number of Suppliers						17.97 (28.50)***
Obs.	3299	2234	2234	2234	1543	2234
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 variables are defined in Table 1. Constants are included in all regressions but are not reported. Numbers in parentheses denote t-values. All parameters are estimated by ordinary least squares. Errors are clustered at the sectoral 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/	0.371	-0.219	39.893	0.009	0.734	31.077
Sales	(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	32.828	-7.583	-6,199.356	0.217	0.017	-6.461
Usage	(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 variables are defined in Table 1. Constants are included in all regressions but are not reported. Parameters in Column (5) are estimated by ordinary least squares. In all other columns, parameters are estimated using a two-stage Heckman selection model. The first stage is the equation presented in Column (4) of Table 2, Panel B. The second stage has been estimated by ordinary least squares, with the exception of Column (2). In Column (2), second stage estimates are obtained using a probit model. In Column (2), we report marginal effects, calculated by taking the mean of all independent variables, instead of parameters' estimates. Numbers in parentheses denote t-values. Errors are clustered at the sectoral level.

	(1) SOD	(2) Discount Dummy	(3) Discount Size	(4) Cost Trade Credit	(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/Total 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

The dependent variables are Payables/Assets, Late Fraction, Late Dummy and Discount Usage. All dependent and independent variables are defined in Table 1. Constants are included in all regressions but are not reported. In Columns (1), (2) and (4), parameters are estimated by ordinary least squares. In Column (3), estimates are obtained using a probit model, and we report marginal effects, calculated by taking the mean of all independent variables, instead of parameters' estimates. Numbers in parentheses denote t-values. Errors are corrected for heteroskedasticity.

	(1) Payables/Assets	(2) Late Fraction	(3) Late Dummy	(4) Discount Usage
Purchases on	0.021	0.051	0.001	-0.030
Account	(1.87)*	(1.48)	(2.14)**	(-0.48)
Due Dates	0.007	0.024	0.002	
	(0.32)	(0.38)	(2.89)***	
Penalty Size	0.002	0.064	-0.006	
	(0.01)	(0.15)	(-1.22)	
SOD	-0.005	0.012	0.000	0.010
	(-0.51)	(0.40)	(1.43)	(0.20)
Discount Size				15.030
				(1.71)*
Discount Period				3.297
				(1.07)
Fear of Denial	-0.850	9.632	0.234	-15.243
	(-0.97)	(4.11)***	(8.35)***	(-3.21)***
Distress	0.076	3.129	0.072	-20.451
	(0.07)	(1.18)	(2.03)**	(-3.57)***
Profit/Sales	0.016	0.519	0.003	-1.957
	(0.16)	(1.24)	(1.17)	(-3.06)***
Log Assets	-0.821	-0.259	0.024	-2.171
	(-5.00)***	(-0.53)	(4.40)***	(-2.32)**
Log Age	0.205	-1.191	-0.005	2.658
	(0.42)	(-0.84)	(-0.32)	(1.04)
Credit Line	0.000	-0.000	0.000	-0.000
	(1.19)	(-2.54)**	(1.81)*	(-0.23)
Other Loans/Sales	-0.021	-0.897	-0.009	-1.342
	(-0.06)	(-1.56)	(-0.80)	(-0.32)
Average Bank				
Distance	0.000	0.001	0.000	-0.009
	(0.22)	(0.28)	(1.13)	(-1.39)
Average Bank				
Months	0.001	0.029	0.000	0.060
	(0.19)	(1.67)*	(2.39)**	(3.02)***
Obs.	2271	1045	2271	623
R-squared	0.01	0.03		0.09

APPENDIX

The sectoral 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	0.2473367	0.2351826	0.5174807
Non metallic minerals	14	0	0	1	0.2232384	0.2043024	0.5724592
Food, kindred products	20	0	0	1	0.2655311	0.1805582	0.5539107
Textile mill products	22	0	0	1	0.4500747	0.1452437	0.4046816
Apparel	23	0	0	1	0.3067605	0.2136476	0.4795919
Lumber, wood products	24	0	0	1	0.426057	0.1690576	0.4048854
Furniture, fixture	25	0	1	0	0.2765208	0.1736231	0.5498561
Paper, allied products	26	0	0	1	0.1945369	0.2103074	0.5951557
Printing publishing	27	0	1	0	0.0727125	0.2007091	0.7265784
Chemicals	28	0	0	1	0.4148054	0.2210059	0.3641887
Petroleum, coal products	29	0	0	1	0.204105	0.2041252	0.5917698
Rubber, plastic products	30	0	1	0	0.3116949	0.1837321	0.504573
Leather	31	0	0	1	0.1373474	0.1659468	0.6967058
Stone, glass, clay products	32	0	1	0	0.3002474	0.2219095	0.4778431
Primary metal industries	33	0	0	1	0.3781688	0.3018656	0.3199656
Fabricated metal products	34	0	1	0	0.4996643	0.2495302	0.2508055
Machinery	35	0	1	0	0.457209	0.1829322	0.3598588
Electrical, electronic equipment	36	0	1	0	0.3359066	0.1655259	0.4985675
Transportation, equipment	37	0	1	0	0.560825	0.2188412	0.2203338
Instruments	38	0	1	0	0.1862195	0.1596277	0.6541528
Miscellaneous products	39	0	1	0	0.2316546	0.1967686	0.5715768

Transportation, communication, public utilities

Other surface passenger transportation	41	1	0	0	0.1202473	0.2571617	0.622591
Motor freight transportation, warehousing	42	1	0	0	0.0685221	0.419475	0.5120029
Water transportation	44	1	0	0	0.1005895	0.5277812	0.3716293
Air transportation	45	1	0	0	0.1525051	0.3030268	0.5444681
Transportation services	47	1	0	0	0.1202473	0.2571617	0.622591
Communications	48	1	0	0	0.0588434	0.3713913	0.5697653
Electric, gas, sanitary services	49	1	0	0	0.0287742	0.2277935	0.7434323

All wholesale trade

Durable goods	50	1	0	0	0.0824163	0.2766676	0.6409161
Non-durable goods	51	1	0	0	0.0824163	0.2766676	0.6409161

All retail trade

Building materials	52	1	0	0	0.0852815	0.2925651	0.6221534
Department stores	53	1	0	0	0.0852815	0.2925651	0.6221534
Food stores	54	1	0	0	0.0852815	0.2925651	0.6221534
Automotive	55	1	0	0	0.0852815	0.2925651	0.6221534
Apparel, accessory stores	56	1	0	0	0.0852815	0.2925651	0.6221534
Furniture	57	1	0	0	0.0852815	0.2925651	0.6221534
Miscellaneous retail stores	59	1	0	0	0.0852815	0.2925651	0.6221534
Drug and proprietary stores	61	1	0	0	0.0319826	0.3874533	0.5805641

Finance, insurance, real estate

Insurance agents, brokers	64	1	0	0	0.0370015	0.5564879	0.4065106
Real Estate	65	1	0	0	0.07582	0.2320732	0.6921068

Other services

Business services	73	1	0	0	0.1450169	0.3012476	0.5537355
Automobile repair, services, parking	75	1	0	0	0.2632619	0.2516201	0.485118
Legal services	78	1	0	0	0.0920972	0.3798817	0.5280211
Com. Engineering, accounting, research	79	1	0	0	0.0920972	0.3798817	0.5280211