

Trade Credit Supply, Market Power and the Matching of Trade Credit Terms

Daniela Fabbri

University of Lausanne
Institute of Banking and Finance (IBF)
CH-1015 Lausanne, Switzerland
41-21-692-3369
daniela.fabbri@unil.ch

Leora F. Klapper*

The World Bank
Development Research Group
1818 H St., NW
Washington, DC 20433
1-202-473-8738
lklapper@worldbank.org

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Abstract: This paper studies the decision of firms to extend trade credit to customers and its relation with their financing decisions. We use a novel firm-level database with unique information on market power in both output and input markets and on the amount, terms and payment history of trade credit simultaneously extended to customers (account receivables) and received from suppliers (account payables). We find that suppliers with relatively weaker market power are more likely to extend trade credit and have a larger share of goods sold on credit. We also examine the importance of financial constraints. Access to bank financing and profitability are not significantly related to trade credit supply. Rather, firms that receive trade credit from their own suppliers are more likely to extend trade credit to their customers, and to “match maturity” between the contract terms of payables and receivables. This matching practice is more likely used when firms face strong competition in the product market (relative to their customers), and enjoy strong market power in the input market (relative to their suppliers). We also find evidence that firms match the ex-post timing of payments, i.e. firms that receive payments early from customers are significantly more likely to remit early to suppliers. These results highlight the importance of supply chain financing for market competition and growth.

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*“Large, creditworthy buyers force longer payment terms on less creditworthy suppliers.
Large creditworthy suppliers incent less credit worthy SME buyers to pay more quickly”*

– CFO Magazine, April 2007

1. Introduction

Trade credit is an important source of funds for both small and large firms around the world (Petersen and Rajan, 1997, Demirguc Kunt and Maksimovic, 2001). Many firms use trade credit both to finance their inputs purchases (accounts payables) and offer financing to their customers (accounts receivables), even in the case of small firms with credit constraints (van Horen, 2005). In this sense, trade credit is an important capital structure decision linking the liability side to the asset side of the firm’s balance sheet. A number of reasons could induce firms to take the decision to extend and use trade credit simultaneously. The risk management practices of firms to match the maturity between their assets and liabilities suggest that firms that need to extend credit to their customers – possibly as a competitive gesture – might be more likely to demand trade credit themselves. In addition, changes in inventory practices have led to firms holding more inventory (i.e., short-term assets), which would increase the demand for payables (short-term liabilities).¹ Furthermore, the increased focus of firms and analysts on cash holdings might offer incentives to firms to extend payment terms in order to maintain higher cash balances (Bates, Kahle, and Stulz, 2008).

These financial and operational decisions introduce a strong link between the use and extension of trade credit and suggest that account receivables (short-term assets) could be used to finance accounts payables (short-term liabilities). This implies a

¹ Additional information on supply chain management operations and survey results of accounts payable managers is available from the “The Accounts Payable Network” (theaccountspayablenetwork.com). Research reports on supply chain management are also available from the Gartner Group (gartner.com).

symbiotic relationship between the decision to supply trade credit to customers and demand trade credit from suppliers. Furthermore, trade credit terms offered to customers should be set to match trade credit terms received from suppliers. In addition, the timing of payments to suppliers should match the receipt of payments remitted from customers.

However, previous related literature has studied only one-side of the trade credit relationship in isolation, i.e. focusing on firms' relationships with their suppliers or with their customers; this is due mainly to data limitations. In this paper, we use a novel data set which allows us to take a multilateral approach.

We use a large firm-level survey of Chinese firms, which is a unique source of data for two main reasons. First, it provides detailed information on the market power and competition of both output and input market. Second, it contains information on the amount, terms, and payment history of both trade credit extended by firms to their customers (account receivables) as well as the receipt of trade credit by firms from their own suppliers (account payables). For example, firms are surveyed on the percentage of sales and inputs financed with trade credit; the number of days offered (maturity); whether a discount is offered for early payment; and the number of days until payment is actually made /received. This allows us to look simultaneously at both sides of firm activity - the relation between a firm, its customers (product market), and its suppliers (input market) - and to precisely match these two sides. This unique perspective is crucial to highlight a direct and novel link between the supply and demand for trade credit.

Our results document the importance of trade credit as a competitive gesture. Specifically, firms that face stronger competition in the product market – for instance,

firms that have introduced new products or lowered prices in the past year, or face competitors with larger market shares - are more likely to extend trade credit and have a larger share of goods sold on credit. We also document that firms are likely to depend on their own receipt of trade credit to finance the extension of trade credit and to match maturity between contract terms of payables and receivables. We find very large and significant relationships between the decision to offer and the use of trade credit; the percentage of inputs and the percentage of sales financed by trade credit; the number of days extended to customers and the maturity received from suppliers; and whether the firm is offered a discount by its suppliers and offers a discount to its customers. This matching practice is more likely among firms that face stronger competition in the output market and enjoy stronger market power in the input market. Furthermore, we find that firms match the ex-post timing of payments, i.e. firms that receive payments early from customers are significantly more likely to remit early to suppliers. These new results highlight the importance of supply chain financing for market competition and growth.

Our paper contributes to the literature on trade credit along several dimensions. Notably, we provide strong empirical support for a matching story between the supply and demand of trade credit. Our finding that firms use their own receipt of trade credit to finance their extension of trade credit is novel in the literature and might provide an explanation for why even small and credit-constrained firms are able to offer trade credit and why even large firms decide to offer trade credit.

With the exception of Kim and Shin (2007),² related literature has always taken a bilateral perspective (firm and supplier or firm and buyer). Some of these papers focus

² They propose a model where account payables and receivables are related and the elasticity of receivables to payables reflect the length of degree of vertical integration along the production process.

on the *non-financial* role of trade credit. For example, trade credit might reduce transaction costs (Ferris, 1981), allow sellers to implement price discrimination across customers with different creditworthiness (Brennan et al., 1988), facilitate the establishment of long term relationships with customers (Summers and Wilson, 2002), and even provide a warranty for product quality when customers cannot observe product characteristics (Long et al., 1993).

More recent literature explains the use of trade credit by assuming that the supplier has some kind of advantage over financial institutions in *lending* to the buyer. Some papers focus on the *liquidation advantage* of the supplier, i.e., a better ability than the bank in salvaging value from existing assets in case of firm's default (Mian and Smith, 1992; Petersen and Rajan, 1997; Frank and Maksimovic, 2005; Fabbri and Menichini, 2007). Other papers assume an *information* advantage, which mitigates the borrowing constraints from the banking sector (Biais and Gollier, 1997; Burkart and Ellingsen 2004). As a consequence, firms are more likely to use trade credit when they are financially constrained by the banking industry (Petersen, Rajan, 1995), in industries where moral hazard problems are tighter (Burkart, Ellingsen, and Giannetti, 2006), in countries with weaker lending environments (Petersen and Rajan, 1997; Demircuc-Kunt and Maksimovic, 2001; Fisman and Love, 2003), or during periods of financial tightening (Calomiris, Himmelberg and Wachtel 1995; Boissay and Gropp 2007; Love et al., 2006). A common prediction of these papers is that borrowing constraints are crucial to explain the use trade credit.

Our paper, however, portrays a different picture. We find that firms rely mostly on account payables to finance account receivables – and not bank financing – and

typically match credit terms between receivables and payables. For instance, we find that only 27% of firms in our sample receive any bank financing, while 45% of firms use accounts payables. We also show that the supply of trade credit and credit terms are set independent of credit constraints, but rather on the availability of internal resources. Our results seem to suggest that firms match assets and liabilities with similar term structures, as a part of a more general risk management policy. This conclusion would explain why large and small firms – constrained and unconstrained firms – all make massive use of trade credit financing.

In line with our findings, Demirguc-Kunt and Maksimovic (2001) document a large use of accounts payables among listed firms around the world, which generally have access to both public and private financial markets. Similar evidence is provided using the *World Bank Enterprise Surveys* database, which includes a sample of over 40,000 firms surveyed in over 50 mostly developing countries around the world³: 60% of all firms use trade credit financing and 87% extend trade credit to their customers, compared to 54% of firms that have access to bank financing. For the sub-sample of small and medium sized firms (with less than 100 employees), who are more likely to be credit constrained, 63% of firms use trade credit financing and 83% extend trade credit to their customers, compared to only 46% of firms that have access to bank financing. In a survey of Vietnamese firms, small firms are also more likely to both grant and receive trade credit than large firms (McMillan and Woodruff, 1999). Moreover, in the Italian manufacturing sector, trade credit finances on average 38.1% of the input purchases of unconstrained firms, as opposed to 37.5% of constrained firms (Marotta, 2001). In

³ Author's estimation. The complete database is available at: <http://www.enterprisesurveys.org>.

addition, most Italian firms providing trade credit are small and medium sized firms that are themselves credit-constrained (i.e. without access to the formal banking sector).

Finally, our paper also highlights the importance of market structure and competition. While other papers have studied the impact of market structure on the use of trade credit (for instance, Fisman and Raturi, 2004 and Neeltje Van Horen, 2005), we investigate the interaction of the market environment of both the input and product markets. Specifically, we examine how a firm's relative market power in relation to its suppliers and its customers affects the supply of trade credit to customers and the use of payables to finance receivables. The traditional idea is that strong market power in the product market gives the supplier an informal mechanism to enforce the repayment of the credit contract, through the threat of stopping the supply of the intermediate goods (see among other Cunat, 2007; Petersen and Rajan, 1997). As a consequence, the supplier provides less trade credit when he faces stronger competition in the product market (McMillan and Woodruff, 1999, Petersen and Rajan, 1995). In contrast, we find that firms facing stronger competition are *more* likely to offer trade credit. In addition, we show that the market structure is also important to explain how firms finance the provision of trade credit. We document that firms are more likely to finance receivables with payables and to match the maturity of contracts between receivables and payables in two situations: First, when they enjoy stronger market power in the *input* market - they can set their own credit conditions. Second, when firms face stronger competition in the *output* market - they are forced to offer trade credit to reduce competition.

The remainder of the paper is organized as follows. Section 2 describes the data. Section 3 develops our main testable hypotheses. Section 4 presents empirical results and Section 5 concludes.

2. Data and Summary Statistics

We use firm-level data on about 2,500 Chinese firms, which was collected as part of the *World Bank Enterprise Surveys* conducted by the World Bank with partners in 76 developed and developing countries. The dataset includes a large, random sample of firms across multiple manufacturing and service sectors. The surveys include both quantitative and qualitative information on barriers to growth, including sources of finance, regulatory burdens, innovations, access to infrastructure services, legal difficulties, and corruption.

The 2003 *World Bank Enterprise Survey* in China asked additional questions on the market environment, such as the number and importance of supplier and customer relationships, and supplier and customer (“supply-chain”) financing. For the purpose of our analysis, the key questions regard the extension and terms of trade credit. Importantly, the survey asks both (i) whether firms offer trade credit to customers and (ii) whether customers accept trade credit from the firm.⁴ This allows us to precisely identify the decision of firms to offer trade credit. From our sample of 2,400 firms, 2,295 firms report whether or not they extend trade credit to their customers.⁵ Table 1 shows variable names, definitions, and means for all variables. We include measures of trade credit, general firm characteristics, indicators of market power of the firm (relative to its

⁴ Detailed questions on supply chain terms were not asked in any other country survey.

⁵ We exclude from our sample 157 firms that provide financial services.

customers and to its suppliers), financial characteristics, and indicators of the collateral value of goods sold and customer creditworthiness. Detailed summary statistics are shown in Table 2 (the full sample) and Table 3 (disaggregated by firms that do and do not offer trade credit). Table 4 shows a correlation matrix of our explanatory variables.

Our main dependent variable is a dummy variable equal to one if the firm offers trade credit (accounts receivable), and zero otherwise (*AR_d*). We find that 40% of the firms in our sample offer trade credit, and that the average percentage of goods sold on credit is 15% (*AR_per*); within the subsample of firms that offer trade credit, the average volume of credit extended represents over 35% of sales. On average, firms that extend trade credit offer customers about one month to pay (the median is 30 days) and we create a dummy equal to one if the firm offers trade credit terms longer than 30 days (*AR_days*). Finally, we find that 20% of firms that offer trade credit offer a prepayment discount on credit to its customers (*AR_discount*).⁶ The use of trade credit in China is comparable to similar developing countries. Although China is known to be a country with a high involvement of the public sector in the economic activity, there are no specific policies that regulate trade credit (Cull et al., 2007).

Our dataset also allows us to examine the payment performance of firms' customers (i.e. the collection of accounts receivables). First, we include the percent of total sales received by customers due to the overdue penalty (*AR_overdue*). We find that 75% of firms receive overdue fines, with an average fee of 19% (and a median of 10%) of total sales. We also construct a multivariate dummy variable (*AR_gap*) equal to one if the difference between the number of days offered to customers and the number of days before the payment of receivables from customers actually takes place is greater than

⁶ We exclude from our sample 157 firms that provide financial services.

zero (i.e. customers prepay their receivables); equal to 0 if the difference equals zero (i.e. customers pay on time); and equal to negative one if the difference is less than zero (i.e. the customers pays late). In our sample, 35% of firms receive early payments of receivables, 37% of firms receive on-time payments, and 27% receive late payments.

Next, we examine firms' use of trade credit from their own suppliers, account payables (AP). We find that 45% of firms use AP (*AP_d*), and the average percentage of supplies financed with credit is about 10% (*AP_per*); within the sample of firms that use AP, credit used equals about 20% of input purchases. Similar to accounts receivable, the average term of payables is approximately one month and we create a dummy equal to one if the firm's payment days is greater than 30 days (*AP_days*). We also find that about 8% of firms that use trade credit are offered a prepayment discount on credit from their suppliers (*AP_discount*). Table 3 shows that 62% of firms that extend trade credit to their customers receive credit from their suppliers, while only 34% of firms that *do not* extend credit use payables; this difference is significant at 1%. Furthermore, a first glance at the data also shows significant differences in payment terms. For example, 36% of firms that extend trade credit to their customers are offered more than 30 days before its supplier imposes penalties, while only 16% of firms that *do not* extend credit receive the same offer; this difference is significant at 1%.

We also include the percent of total input costs paid to suppliers due to overdue penalties (*AP_overdue*). About 25% of firms pay overdue fines, at an average of 1.67% of input costs. We also construct a multivariate dummy variable (*AP_gap*), equal to one if the number of days received from suppliers is less than the number of days until the firm pays its suppliers (i.e. the firm pays its payables to suppliers early); equal to 0 if the

difference equals zero (i.e. the firm pays its suppliers on time); and equal to negative one if the difference is less than zero (i.e. the firm pays its suppliers late). In our sample, 29% of firms make early payments of receivables, 51% of firms make on-time payments, and 20% of firms pay late.

Additional preliminary support of the interdependence between the use and extension of trade credit is shown in Table 5. Panel A summarizes the main sources of firm financing: Banks, Suppliers (trade credit), Family and Informal Sources, and Retained Earnings and Equity. Data is summarized by age, size, and ownership. For instance, we find that larger firms use more trade credit than smaller firms – that are more likely to be credit constrained – and that foreign-owned firms use more trade credit than state-owned firms. Panel B shows summary statistics disaggregated by firms that offer trade credit ($AR_d=1$) and firms that do not offer trade credit ($AR_d=0$). We find significant differences in the use of trade credit among these two groups. For instance, young firms and small and medium sized enterprises (with less than 250 employees) that extend trade credit use significantly more trade credit from suppliers.

We include in all regressions some general firm characteristics, which are likely to be associated with trade credit. First, the log number of years since the firm was established (L_Age).⁷ Second, we use as a proxy for firm size the log number of total employees (including contractual employees) (L_Emp). All our empirical results are robust to using alternative measures of firm size, such as dummies indicating small, medium, and large firms. Third, we include a dummy variable equal to one if the percentage of the firm owned by foreign individuals, foreign investors, foreign firms, and foreign banks is greater than 50%, and equal to zero otherwise ($D_Foreign$). Forth, we

⁷ The minimum age of firms in the sample was restricted to four.

include a dummy variable equal to one if the percentage of the firm owned by the government (national, state, and local, and cooperative/collective enterprises) is greater than 50% (*D_State*). We include these ownership dummy variables to control for possible preferential access to financing from foreign and state-owned banks, respectively. It might also be the case that foreign and state-owned firms have preferential foreign and government product markets, respectively, and are not as sensitive to market competition. In our sample, 7% of firms are foreign owned, while 22% are state owned. Fifth, we include a dummy variable equal to one if the firm sells its products abroad, and equal to zero otherwise (*D_Export*). We include this variable to control for possible differences in trade credit use among national and foreign customers. In our sample, 9% of firms are identified as exporters. We also include in all regressions 13 sector dummies and 17 city dummies.

Our next set of variables measure market power and competition. First, we measure the importance of the firm's largest customer with a dummy variable equal to one if the percent of total sales that normally goes to the firm's largest customer is greater than 5% (the median), and 0 otherwise (*Saleslargestcust_5*). Moreover, we proxy for a more competitive environment with a dummy equal to one if on average, and relative to the average of the last year, the firm has lowered prices on its main business line, which we assume was done as a competitive gesture (*Lowered_prices*). We also include a dummy variable if the firm has introduced a new product (or service) or business line in the past year, assuming that this would require the firm to compete with a new product (*New_product*). As shown in Table 3, in bivariate tests, firms operating in more

competitive environments – using all measures of market power and competition – are more likely to extend trade credit to customers.

We also construct a new dummy variable (*Bi_mktpower*) that measures simultaneously the market structure in the input and output markets. Our unique dataset includes information on the market power of manufacturing firms in relation to both their customers and their suppliers. First, we construct a dummy variables that measures the bargaining power of a firm relative to its *suppliers* (*Main_customer*), which is equal to one if the firm is the most important customer of its main supplier and zero otherwise. We compare this variable to *Saleslargest_5*, which is a measure of the market power of a firm relative to its *customers*.

In our sample, 751 of 1762 firms (43%) have weak bargaining power relative to their customers (*Saleslargest_5* equals one), and 637 of 1514 firms (42%) are in a strong position relative to their suppliers (*Main_customer* equals one). Firms with available information on both sides of the markets are 1205: 29% of firms have weak bargaining power relative to their customers and strong market power relative to their suppliers; 37% of these firms have weak bargaining power relative to both their customers and their suppliers; 14% of firms have strong bargaining power relative to their customers and strong market power relative to their suppliers; finally, 20% of these firms have strong bargaining power relative to their customers and weak market power relative to their suppliers. The correlation between the market power in the input and output markets is slightly negative (-0.0289) but not significantly different from zero, suggesting that there is no correlation between the strength of the contractual position of a firm in the input and output market.

We hypothesize that the most likely scenario for a firm to use its own payables to finance its receivables – and match payment terms – is in the case where a firm is in the strong position to demand trade credit from its suppliers, but must offer trade credit from a weak position relative to its customers. Hence, *Bi_mktpower* takes value equal to one if two conditions are satisfied: First, the proportion of total sales that normally goes to the firm's largest customer is greater than 5%, which indicates that the firm has weak bargaining power towards its customer (*Saleslargest_5* equals one). Second, the firm is the most important customer of its main supplier, i.e. the firm has strong bargaining power towards its supplier. In the remaining cases, the variable is assumed to be zero.

Next, we include various measures of financial liquidity. We use the percentage of unused line of credit, equal to zero if the firm does not have a line of bank credit (*LC_unused*), which is 7% on average. Less than 30% of firms have access to a line of credit from the banking sector, and on average, firms that have a line of credit have 26% unused. The low-level of financial access to formal credit market might suggest that many Chinese firms are credit constrained. We also include a dummy variable equal to one if the firm has profits greater than zero. Bivariate tests find that firms that extend trade credit are significantly more likely to have a larger unused line of credit and positive profitability.

Related literature has also documented that weak legal institutions constrain the ability of firms to access external financing such as long term debt or equity (Demirguc-Kunt and Maksimovic, 1998; 1999), and reduce firm growth opportunities (Demirguc-Kunt and Maksimovic, 2006). In addition, Johnson, McMillan and Woodruff (2002) document that entrepreneurs who report that courts are effective grant 5% more trade

credit on average, but this effect is significant only for new-relationships. Legal institutions matter when contracts are written and disputes between parties arise. In our sample, 88% of firms – 1950 out of a total of 2216 firms – enter into written contracts with customers and 82% do the same with suppliers of raw materials. Thus, almost all firms in our sample use written contracts. Furthermore, 29% of the sample report disputes with customers; 23% of the sample report disputes with suppliers. These figures are relatively low if compared with the average (58%) of firms located in the formerly planned economies of Eastern Europe and former Soviet Union (Johnson, McMillan and Woodruff, 2002).

In case of disputes, however, the use of court action is also quite low. Among the 572 firms having disputes with customers, 47% of them use court action, 8% use arbitration, and 74% negotiation. In the case of negotiation, 80% of firms recover the full value, while in case of court action 84% of the firms do not recover anything. Similar figures arise when we look at disputes with suppliers: among the 435 firms reporting at least one dispute with suppliers, only 23% rely on court action; 5% firms use arbitration, and 65% use negotiation. Overall, this evidence seems to suggest that when firms have disputes, they prefer to renegotiate and to avoid relying on the assistance of third-parties, in line with Johnson, McMillan and Woodruff (2002). This could suggest that the quality of legal institutions is not crucial given that only few firms rely on court action. However, it could also be that firms rely seldom on courts since they anticipate that the cost will be too high.

To gain a better understanding of the role of legal enforcement, we use firm-level survey information on the relation between the firm and the local judiciary. Firms are

asked to evaluate the likelihood that the legal system will uphold contracts and property rights in business disputes in a scale ranging from zero to one. We call this variable (*Property_right*); the median value is 80%, suggesting that less than 20% consider judicial efficiency a constraint to doing business.⁸ This variable is defined at the firm-level and therefore reflects how the firm *perceives* the quality of legal institutions. This is a nice feature of our data since it is likely that the effect of institutions on firm activity also depends on the characteristics of the firm (i.e., size).

Lastly, we include a set of variables to test the robustness of previous theories, in particular, that trade credit is related to collateral values and customer creditworthiness. We broadly use the definition of collateral to include both indicators of firm “uniqueness” (i.e. resale value), as well as the ease in which the firm can seize collateral in the case of default. In a developing country such as China, legal contracts, confidence in the judicial system to enforce contracts, and information on the integrity of customers are all important indicators in the decision to extend credit. We include two direct measures of collateral value: First, the percent of sales made to clients’ unique specification i.e. that cannot be sold to other clients (*Uniqueness*), which is about 40% of goods, on average. Second, the approximate percent of goods that are certified (*Certified_products*), which is about 47% of goods, on average. We also assume that written contracts facilitate the seizure of goods in the case of default, and include a dummy variable equal to one if the firm generally does not enter written contracts with clients, and equal to zero if the firm generally does use written contracts (*Contracts*).

⁸ Our results are robust to the inclusion of *Law_predictability*, which measures the predictability of laws or regulations that materially affect the operation and growth of business; however, this variable is missing for about 1/3 of firm observations.

We also include a dummy variable equal to one if the firm is likely to find out if one of its clients deceives another firm (for example, the client defaults strategically on its repayment duties), and zero otherwise (*Cust_deception*). About 40% of firms report that they would not be able to determine client deception.

Finally, we are concerned that trade credit patterns within supply chains might be endogenous to industry characteristics. For instance, there might be “industry standards” which set the percentage and terms of trade credit. We control for this by including 12 “industry” dummies (2-digit NACE codes) in all regressions, which is the finest level of sector classification available. Although additional detailed information is available on the firm’s “main business” line, this includes 1,818 descriptions and 99% of classifications describe only one firm. Nevertheless, we studied the trade credit patterns of firms within a few classifications with more than 10 firms – and found no “systematic” patterns. For instance, 33 firms are classified as “dress manufacturing.” On average, 31% of firms extend trade credit and 53% of firms receive trade credit. For the 11 firms that extend trade credit to their customers, the percentage of sales offered ranges from 10% to 100% (the median is 20%); terms offered include 3, 4, 10, 30, 40, and 90 days; and three firms offer a discount. Examinations of additional narrow industry classifications found similar disparities across firms.⁹

3. Hypotheses

3.1 The Market Power Hypothesis

First, we test whether the decision to extend trade credit to customers depends on the market structure where the firm operates:

⁹ Additional industries available upon request.

$$\text{Accounts Receivable (AR) indicators} = f \{ \text{Firm characteristics, Market Power indicators} \} \quad \{1\}$$

3.2 The Financial Constraint and Supply Chain Hypotheses

The next step is to understand how firms finance the supply of trade credit. In principle, firms can use internal resources, like profits. Alternatively, if they have access to external finance, they can use bank credit. According to previous literature (Frank and Maksimovic 2005, Burkart, Ellingsen, and Giannetti 2006), firms that are financially constrained on bank credit should extend less trade credit. An extension of this argument is that firms that are financially constrained should extend shorter terms.

We provide an alternative hypothesis – that firms finance their extension of trade credit (accounts receivables) with access to trade credit from their own suppliers (accounts payables). An extension of this argument is our “matching maturity hypothesis,” which assumes that firms aim to match the maturity of their assets and liabilities also in trade credit decisions. It is well known in the capital structure literature that firms use long-term debt to finance their long-term assets as a sound risk management practice. We assume that firms have only one short-term asset – accounts receivables – and one short-term liability – accounts payables. We thus estimate the following hypothesis:

$$\text{AR indicators} = f \{ \text{Firm characteristics, Financial characteristics, Accounts Payable (AP) indicators} \} \quad (2)$$

If it is indeed the case that firms finance their extension of accounts receivables with their receipt of accounts payables, firms would need to match terms to avoid late charges, i.e. a firm would need to use money remitted from customers to pay its

suppliers. We use interaction terms to test whether credit constrained firms depend more on matching the terms of their account receivables and account payables. In summary, we estimate the following hypothesis:

$$AR\ indicators = f\{Firm\ characteristics, Financial\ characteristics, AP\ indicators, Interaction\ of\ Financial\ and\ AP\ indicators\} \quad (3)$$

We also use interaction terms of market structure and accounts payable usage to test whether firms operating in a more competitive market are more likely to use their receipts of accounts payable to finance their extension of trade credit and to match credit terms. We use two indicators of market power: First, a measure of the percent of total sales that normally goes to the firm's largest customer (*Saleslargest_5*). We expect a positive correlation between this variable and account receivables indicators. Second, an index of competition in the output and input markets, *Bi_mktpower*, as defined in Section 2. We expect that firms are more likely to match receivables with payables (both the amount and credit terms) when they (i) face stronger competition in the output market, i.e. they are forced to offer trade credit to their customers, and (ii) command stronger market power in the input market, i.e. they can set their own credit conditions to suppliers. We thus test the following hypothesis:

$$AR\ indicators = f\{Firm\ characteristics, Market\ Indicators, AP\ indicators, Interaction\ of\ Market\ and\ AP\ indicators\} \quad (4)$$

An alternative way to test our matching maturity story is to look at *actual* trade credit terms used, rather than the terms *offered*. Our data set provides unique information on the percentage of owed accounts payable and accounts receivable that are overdue and on the number of days before accounts receivable are actually received and accounts

payable are actually paid. If firms aim to match the maturity of their assets and liabilities – and/or use remitted receivables to finance their payment of payables – we should find that firms have a larger share of accounts payable overdue when their customers delay the repayment of a larger share of receivables. Similarly, we expect firms to pay account payables relatively quicker to their suppliers if their customers pay faster as well. Our model is then:

$$AP\ indicators = f\{Firm\ characteristics, AR\ indicators, Financial\ indicators\} \quad (5)$$

4. Results

Regressions are shown in Tables 6 to 11. All regressions control for general firm characteristics. Consistently, we find that larger firms are more likely to extend trade credit, which might be related to their longer and more established customer and supplier relationships. Moreover, younger firms are more likely to offer trade credit, which can be due to the fact that new firms face stronger competition when entering the product market. We find no consistent significant relationships, however, with foreign or state ownership or exports.

Table 6 shows that various measures of weaker market power and competition have a positive and highly statistical significant effect on the decision to offer trade credit and the percentage of sales financed with credit.¹⁰ For instance, the larger the market share of competitors and the larger the percentage of sales to the largest customer, the less likely are firms to extend trade credit. In addition, firms that have introduced new products or lowered prices in the past year are more likely to extend trade credit,

¹⁰ This result is consistent with the cross-country findings of Van Horen (2004).

presumably as a competitive gesture. This suggests that when firms face an increase of competition in the product market, they are more likely to offer trade credit to their customers and allow customers to pay a larger share of sales on account. In this case, trade credit might be used as a competitive device to reduce actual competition or to prevent entry. In both cases, trade credit becomes crucial for the survival of the firm. This would explain why even small firms without access to bank credit might still want to extend trade credit to their customers.

Firms have different channels to finance the supply of trade credit, such as external financing (bank credit), internal resources (profits), or alternatively, credit from suppliers (accounts payable). Table 7 documents the relevance of each source of financing. Neither the existence of unused bank credit lines (*LC_unused*) nor positive profitability seem to have an effect on the likelihood to offer trade credit, the percentage of sales financed by trade credit, the likelihood of longer days, or the offer of a pre-payment discount.¹¹

The most intriguing finding of Table 7 is that firms use account payables to finance the provision of account receivables and that firms “match maturity” of trade credit received from their own suppliers with the one offered to their customers. We find very large and significant relationships between the decision to offer and the use of trade credit; the percentage of inputs purchased on account and the percentage of goods sold on credit; the number of days extended to customers and the ones received from suppliers;

¹¹ These results are robust to the exclusion of accounts payable terms.

and whether the firm is offered a discount by its suppliers and offers a discount to its customers.¹²

Overall, the evidence reported in Table 7 suggests that the supply of trade credit is primarily financed by trade credit use and that credit terms are offered to customers to match credit terms received from suppliers. In contrast, financial constraints do not seem to deter firms from offering trade credit and trade credit terms are not set depending on the availability of external or internal financing. These findings suggest that firms use a risk management attitude in dealing with supplier credit: they tend to match maturities between assets and liabilities.

A related question is whether the use of accounts payable to finance accounts receivable is more likely among credit-constrained firms or among firms lacking internal resources. Table 8 documents the results. The interaction terms between measures of accounts payables and *LC_unused* are never statistically significant, suggesting that the decision to use account payables to finance accounts receivables does not depend on access to bank financing. We obtain similar results when we interact accounts payable variables and profitability. The same results are also found if we include the smaller sample of trade credit terms (maturity and prepayment discounts, not shown). In summary, the evidence presented in Table 8 confirms the findings in Table 7: Credit constraints by the banking sector or lack of internal resources do not seem to affect the dependence between the supply and demand of trade credit.

Table 9 shows that the extent to which firms match account payables with account receivables depends on the bargaining power enjoyed simultaneously in the input and

¹² Note that the regressions using trade credit terms – *AR_days* and *AR_discount* – are missing if the firm does not offer trade credit (i.e *AR_d=0*).

output markets. In particular, the coefficients of the interaction term between the index of market power - *Bi_mktpower* - and the decision to offer trade credit or the share of sales financed by trade credit - *AR_d* and *AR_per* - are positive and statistically significant. These findings suggest that our supply chain hypothesis is most likely to hold when firms *need* to offer trade credit to their customers (as a competitive gesture), but have enough bargaining power with suppliers to set their own credit conditions.¹³

Table 10 uses ex-post information (for the sample of firms that have positive accounts payable) on effective payment terms – the spread between number of days offered to customers and the number of days before customers remit (*AR_gap*) and the spread between the number of days offered by suppliers and the number of days before the firm remits (*AP_gap*) – to test our matching maturity story. We also control for external and internal resources through *LC_unused* and *Profit_d*.

The share of unused bank credit and having internal funds (positive profits) are never significant in determining early or late payments. However, we find strong statistical significance for our matching maturity story – in particular, Columns 4-6 show that firms are significantly more likely to pay their suppliers early if their customers remit early. In Column 6, we control for whether the firm is offered a discount from its suppliers for early payment. We find that firms offered discounts are significantly more likely to pay early (*AP_discount*), although the interaction with *AR_gap* is insignificant (not shown).¹⁴ We also find weak evidence (Columns 1 and 2) that firms pay their suppliers late when their customers pay late as well (*AR_gap*). We postulate that this relationship is weaker since firms will use other sources of financing (e.g. personal funds)

¹³ Notice that the variable *Bi_mktpower* is only available for the sub-sample of manufacturing firms. All results for all tables are robust for the subsample of manufacturing firms.

¹⁴ In addition, the interaction with unused lines of credit and profitability is insignificant (not shown).

before disrupting a trade relationship. We also test the determinants of overdue payables to suppliers (as a percentage of input costs) (*AP_overdue*). In general, the share of overdue payments from customers (as a percentage of sales, *AR_overdue*) is positive but insignificant (not shown). Overall, this evidence suggests that firms use the proceeds from remitted receivables to pay outstanding payables.

Table 11 tests a series of variables found to be significant indicators of trade credit supply in previous literature. We find that after including accounts payable terms, higher collateral values (*Uniqueness*) are insignificant. The only exception is the share of certified product, which increases the share of goods sold on credit. Moreover, entering into written contracts with clients increases the likelihood to offer trade credit. Both of these higher customer demands might also proxy for higher quality and/or foreign customers – who might be in the stronger position to demand trade credit from suppliers.

For robustness, we also add our measure of firm's perceptions of property rights to our previous models. Our results (in particular the ones predicting the use of accounts payable) do not change. In addition, the likelihood that the legal system will uphold contracts and property rights seem to have no significant impact on trade credit supply (Table 11, Columns 4 and 8). Our results are consistent with the previous evidence that most firms in our sample do not have disputes with trading partners and any disputes that do occur seldom rely on court action.

Our results still hold if we restrict the sample to only profitable firms (*Profit_d=1*) or to firms with a state ownership (national, state, and local, and cooperative/collective enterprises) lower than 50% (*D_State=0*). Similarly, we get similar results if we replace the log of total employment with the log of total sales, although we are less comfortable

using accounting data of the large number of unaudited firms in our sample. Our results are also robust to the inclusion of a dummy variable equal to one if the firm belongs to a government sponsored industrial park, science park, or Export Promotion Zone (EPZ).

Finally, our data set provides information on a cross-section of firms only for a given year. However, our survey allows us to control for some changes in firm policy occurred in the past. For example, the variable *New_product* included in our regressions reflects whether a firm has introduced new products (or services) in the past year and therefore this variable also controls for changes in the firm's investment policy. In addition, limited accounting information is available, both for the current and previous years.¹⁵ We can use this information to control for potential idiosyncratic shocks at the firm level. For example, we construct a set of dummy variables to control for whether the firm increased sales or fixed assets in the past three years. These dummies are insignificant and do not affect our main results.

5. Conclusions

This paper uses firm-level data on about 2,500 Chinese firms to study the decision to extend trade credit. Supplier financing is often overlooked in the capital structure literature, although it is arguably the most important source of small and medium sized financial intermediation – particularly in countries with less developed financial and information systems. We show that firms are likely to offer trade credit as a competitive gesture. We also find that firms are likely to depend on credit from their own suppliers to finance the extension of trade credit to their customers to match credit terms between accounts payable and accounts receivable, in particular firms with stronger market power

¹⁵ The survey instrument and data are available at: www.enterprisesurveys.org.

in the input market and facing strong competition in the output market. Furthermore, we find evidence that firms match their ex-post payment decisions. These results highlight the importance of supply chain financing for market competition and growth.

References:

Thorsten Beck, Asli Demirguc-Kunt and Vojislav Maksimovic 2006. Financial and Legal Constraints to Growth: Does Firm Size Matter. *Journal of Finance* 1, 137-177.

Bates, Thomas, Kathleen Kahle, and Rene Stulz, 2008, Why do U.S. Firms Hold so Much More Cash than They Used to?, working paper.

Biais, Bruno and Christian Gollier, 1997. Trade Credit and Credit Rationing. *Review of Financial Studies* 10, 903-937.

Frederic Boissay and Reint Gropp, 2007. Trade Credit Defaults and Liquidity Provision by Firms, European Central Bank Working Paper n. 753.

Brennan, Michael, Vojislav Maksimovic and Josef Zechner, 1988. Vendor Financing. *Journal of Finance* 43, 1127-1141.

Burkart, Mike and Tore Ellingsen, 2004. In-Kind Finance: A Theory of Trade Credit. *American Economic Review* 94, 569-590.

Burkart, Mike, Tore Ellingsen, Mariassunta Giannetti, 2006. What You Sell is What You Lend? Explaining Trade Credit Contracts. ECGI Finance Research Paper No. 71/2005.

Calomiris, Charles., Charles. Himmelberg, and Paul Wachtel, 1995. Commercial Paper, Corporate Finance and the Business Cycle: A Microeconomic Perspective, Carnegie-Rochester Series on Public Policy 42, 203-50.

Cull, Robert, Lixin Colin Xu, and Tian Zhu, 2007. Formal Finance and Trade Credit During China's Transition, World Bank Working Paper.

Cunat, Vicente (2006), "Trade Credit: Suppliers and Debt Collectors as Insurance Providers," *Review of Financial Studies*, 20.

Demirguc-Kunt, Asli, and Vojislav Maksimovic, 1999. Institutions, Financial Markets, and Firms Debt Maturity. *Journal of Financial Economics* 54, 295-336.

Demirguc-Kunt, Asli, and Vojislav Maksimovic 1998. Law, Finance, and Firm Growth. *Journal of Finance* 6, 2107-2137.

Demirguc-Kunt, Asli, and Vojislav Maksimovic, 2002. Firms as Financial Intermediaries: Evidence from Trade Credit Data, World Bank Working Paper.

Fabbri, Daniela and Annamaria Menichini, 2006. Trade Credit, Collateral Liquidation and Borrowing Constraints. Swiss Finance Institute Working Paper.

- Ferris, J. Stephen, 1981. A Transaction Theory of Trade Credit Use. *Quarterly Journal of Economics* 96, 247-270.
- Fisman, Raymond and Inessa Love, 2003. Trade Credit, Financial Intermediary Development, and Industry Growth, *Journal of Finance* 58, 353-374.
- Fisman, R., Raturi, M., 2004. Does Competition Encourage Credit Provision? Evidence from African Trade Credit Relationships. *Review of Economics and Statistics* 86, 345-52.
- Frank, Murray and Vojislav Maksimovic, 2005. Trade credit, Collateral, and Adverse Selection. University of Maryland Working Paper.
- Kim Se-Jim and Hyun Song Shin, 2007. Industrial Structure and Corporate Finance. Princeton University Working Paper.
- Lee, Hau L. and Chung-Yee Lee Springer, 2007, Building Supply Chain Excellence in Emerging Economies, Science+Business Media: United Kingdom.
- Long, Michael S., Ileen B. Malitz and S. Abraham Ravid, 1993. Trade Credit, Quality Guarantees, and Product Marketability. *Financial Management* 22, 117-127.
- Marotta, Giuseppe, 2005. Is Trade Credit More Expensive than Bank Credit Loans? Evidence from Italian Firm-Level Data. *Applied Economics* 37(4), 403-416.
- McMillan, John and Christopher Woodruff, 1999. Interfirm Relationships and Informal Credit in Vietnam, *The Quarterly Journal of Economics* 114, 1285-1320.
- Mian, Shehzad L. and Clifford W. Smith, 1992. Accounts Receivable Management Policy: Theory and Evidence. *Journal of Finance* 47, 169-200.
- Petersen, Mitchell and Raghuram G. Rajan, 1995. The Effect of Credit Market Competition on Lending Relationships. *Quarterly Journal of Economics* 110, 407-443.
- Summers, Barbara and Nicholas Wilson, 2002. Trade Credit Terms Offered by Small Firms: Survey Evidence and Empirical Analysis. *Journal of Business and Finance Accounting* 29, 317-335.
- Van Horen, N., 2004. Do firms use trade credit as a competitiveness tool? Evidence from Developing Countries, World Bank Working Paper.

Table 1: Variable Definitions and Mean Statistics

Variable Name	Definition	Mean
<i>Measures of Trade Credit</i>		
AR_d	Dummy (0/1), =1 if the firm offers credit to its customers (i.e. accounts receivable), =0 if the firm does not offer trade credit	0.39
AR_per	The percent of monthly sales sold on credit	14.02
AR_days	Dummy (0/1), =1 if the average number of days customers are allowed to use the credit before the firm imposes penalties is greater than 30, =0 otherwise (and = . if AR_d is =0)	0.50
AR_discount	Dummy (0/1), =1 if the firm offers a pre-payment discount on credit to its customers, =0 otherwise (and = . if AR_d is =0)	0.20
AR_gap	Dummy variable =1 if the difference between the number of days offered to customers less the number of days until receivable payments are received from customers is greater than zero (i.e. customers prepay their receivables); =0 if the difference equals zero (i.e. customers pay on time); and =-1 if the difference is less than zero (i.e. the customers pays late)	0.08
AR_overdue	The percent of total sales received by customers due to the overdue penalty	18.64
AP_d	Dummy (0/1), =1 if the firm uses supplier credit (i.e. accounts payable) to purchase inputs, =0 otherwise	0.45
AP_per	The percent of inputs purchased on credit (based on period averages), = 0 if the firm does not use trade credit	9.58
AP_days	Dummy (0/1), =1 if the average number of days the firm is allowed to use the credit before its suppliers imposes penalties is greater than 30, =0 otherwise (and = . if AP_d is =0)	0.25
AP_discount	Dummy (0/1), =1 if the firm received a pre-payment discount on credit from its suppliers, =0 otherwise (and = . if AR_d is =0)	0.07
AP_gap	Dummy variable =1 if the difference between the number of days offered to the firm by its suppliers less the number of days until the firm pays its suppliers is greater than zero (i.e. the firm prepays its payables); =0 if the difference equals zero (i.e. the firm pays its suppliers on time); and =-1 if the difference is less than zero (i.e. the firm pays its suppliers late)	0.09
AP_overdue	The percent of total input costs paid to suppliers due to the overdue penalty	1.67
<i>General Firm Characteristics</i>		
L_Age	Log number of years (+1) since the firm was established	2.57
L_Emp	Log average number of total employees (including contractual employees)	4.94
D_Foreign	Dummy (0/1), =1 if the percentage of the firm owned by foreign individuals, foreign institutional investors, foreign firms, and foreign banks is greater than 50, =0 otherwise	0.07
D_State	Dummy (0/1), =1 if the percentage of the firm owned by the government (federal, state, local, and collective/cooperative enterprises) is greater than 50, =0 otherwise	0.23
D_Export	Dummy (0/1), =1 if the firm is exporting, =0 otherwise	0.09

<i>Indicators of (Weaker) Market Power of the Seller (relative to its Customers)</i>		
Saleslargest_5	Dummy (0/1), =1 if the percent of total sales that normally goes to the firm's largest customer is greater than 5%, =0 otherwise	0.57
Lowered_prices	Dummy (0/1), =1 if on average, and relative to the average of the last year, the firm has lowered prices on its main business line, =0 otherwise	0.48
Compmktshare_1	Dummy (0/1), =1 if the firm's main competitor's share in the domestic market for the firm's most important product is more than one percent, =0 otherwise	0.28
New_product	Dummy (0/1), =1 if the firm has introduced new products (or services) in the past year, =0 otherwise	0.42
Bi_mktpower	Dummy (0/1), =1 if the percent of total sales that normally goes to the firm's largest customer is greater than 5% (i.e. <i>Saleslargest_5</i> = 1), <u>and</u> the firm is its largest supplier's most important customer, =0 otherwise.	0.29
<i>Financial Characteristics</i>		
LC_unused	The percent of the firm's line of credit or overdraft facility that is currently unused (=0 if the firm does not have a line of credit or overdraft facility)	0.07
Profitable	Dummy (0/1), =1 if the firm has profits greater than zero, =0 otherwise	0.61
<i>Legal Characteristics</i>		
Property_rights	The likelihood (%) that the legal system will uphold contracts and property rights in business disputes	63.20
<i>Indicators of Collateral Value and Customer Creditworthiness</i>		
Uniqueness	The percent of sales made to clients' unique specification (i.e. that cannot be sold to other clients)	37.53
Certified_products	The approximate percent of products that are certified	46.58
Cust_deception	Dummy (0/1), =1 if one of the firm's clients deceives another firm (for example, has the ability to pay, but does not), and the firm is likely to find out, =0 otherwise	0.60
Contracts	Dummy (0/1), =1 if the firm generally enters into written contracts with clients, =0 otherwise	0.88

Table 2: Summary Statistics

See Table 1 for variable definitions.

Variable Name	Obs.	Mean	Std. Dev.	Min	Max
AR_d	2,157	0.39	0.49	0.00	1.00
AR_per	2,184	14.02	27.97	0.00	100.00
AR_days	818	0.50	0.50	0.00	1.00
AR_discount	823	0.20	0.40	0.00	1.00
AR_gap	809	0.08	0.79	-1.00	1.00
AR_overdue	813	18.64	20.47	0.00	100.00
AP_d	2,100	0.45	0.50	0.00	1.00
AP_per	2,069	9.58	21.41	0.00	100.00
AP_days	656	0.25	0.44	0.00	1.00
AP_discount	829	0.07	0.26	0.00	1.00
AP_gap	656	0.09	0.70	-1.00	1.00
AP_overdue	802	1.67	6.31	0.00	90.00
L_Age	2,243	2.57	0.74	1.39	3.99
L_Emp	2,239	4.94	1.48	0.00	11.16
D_Foreign	2,242	0.07	0.26	0.00	1.00
D_State	2,242	0.23	0.42	0.00	1.00
D_Export	2,265	0.09	0.28	0.00	1.00
Saleslargest_5	1,762	0.57	0.49	0.00	1.00
Compmktshare_1	2,180	0.28	0.45	0.00	1.00
Lower_price	2,222	0.48	0.50	0.00	1.00
New_product	2,223	0.42	0.49	0.00	1.00
Bi_mktpower	1,205	0.29	0.45	0.00	1.00
LC_unused	2,152	0.07	0.21	0.00	1.00
Profitable	2,243	0.61	0.49	0.00	1.00
Property_rights	1,935	64.42	38.52	0.00	100.00
Uniqueness	2,047	37.53	42.05	0.00	100.00
Certified	2,065	46.58	45.80	0.00	100.00
Contract	2,216	0.88	0.33	0.00	1.00
Cust_deception	2,173	0.60	0.49	0.00	1.00

Table 3: Mean Differences, by Trade Credit Supply

See Table 1 for variable definitions. t-statistics show the mean difference of firms that offer trade credit to customers versus firms that do not offer trade credit to customers. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Variable Name	AR_d=0	AR_d=1	Sig.
AP_d	0.34	0.62	***
AP_per	4.44	17.51	***
AP_30	0.16	0.36	***
AP_discount	0.05	0.09	**
AP_gap	0.07	0.12	
AP_overdue	1.57	1.77	
L_Age	2.60	2.51	***
L_Emp	4.84	5.11	***
D_Foreign	0.06	0.10	***
D_State	0.24	0.19	***
D_Export	0.09	0.11	*
Saleslargest_5	0.54	0.64	***
Bi_mktpower	0.26	0.33	***
Compmktshare_1	0.23	0.36	***
New_product	0.36	0.51	***
Lower_price	0.41	0.60	***
LC_unused	0.06	0.09	***
Profitable	0.58	0.66	***
Property_rights	63.20	66.76	**
Uniqueness	37.45	37.60	
Certified_products	41.42	55.00	
Contract	0.85	0.93	***
Cust_deception	0.57	0.65	***

Table 4: Correlation Matrix

See Table 1 for variable definitions ***, ** and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Explanatory Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
AP_d (1)	1.00														
AP_per (2)	0.51**	1.00													
AP_days (3)	.	0.25**	1.00												
AP_discount (4)	.	0.02	0.09*	1.00											
L_Age (5)	-0.07**	-0.03	0.00	0.04	1.00										
L_Emp (6)	0.11**	0.14**	0.16**	0.03	0.29**	1.00									
D_Foreign (7)	0.05*	0.12**	0.03	0.01	-0.11**	0.09**	1.00								
D_State (8)	-0.12**	-0.08**	-0.04	0.01	0.40**	0.21**	-0.15**	1.00							
D_Export (9)	0.04*	0.07*	0.06	0.02	-0.08*	0.21*	0.36*	-0.12*	1.00						
Saleslargest_5 (10)	0.03	0.12**	0.18**	-0.01	-0.05*	0.02*	0.10**	-0.08**	0.12*	1.00					
New_product (11)	0.12**	0.14**	0.15**	0.02	-0.06**	0.23**	0.03	-0.03	0.06*	0.14**	1.00				
Lower_price (12)	0.09**	0.11**	0.15**	0.01	-0.05**	0.06**	0.01	-0.07**	0.06*	0.18**	0.22**	1.00			
Compmktshare_1 (13)	0.13**	0.11**	0.06	0.04	-0.05**	0.27**	0.10**	-0.02	0.06*	0.13**	0.31**	0.16**	1.00		
Bi_mktpower (14)	0.08***	0.14***	0.11**	-0.05	-0.06**	0.17***	0.08**	0.00	0.13*	0.46***	0.09**	0.13***	0.19***	1.00	
LC_unused (15)	0.10**	0.16**	0.09**	0.01	-0.02**	0.20**	0.08**	0.00	0.10*	0.08**	0.16**	0.08**	0.17**	0.08**	1.00
Profitable (16)	0.08**	0.04*	0.03	0.03	-0.15**	0.15**	0.03	-0.12**	0.10*	0.02	0.19**	0.08**	0.18**	0.08**	0.15**

Panel B: Dependent Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
AR_d	0.27**	0.30**	0.23**	0.08**	-0.06**	0.09**	0.08**	-0.06**	0.04*	0.10**	0.15**	0.18**	0.13**	0.08***	0.07**	0.07**
AR_per	0.23**	0.35**	0.20**	0.00	-0.06**	0.10**	0.09**	-0.08**	0.12*	0.16**	0.14**	0.17**	0.14**	0.11***	0.08**	0.09**
AR_days	0.09**	0.07	0.14**	-0.02	-0.02	0.09**	0.02	0.02	0.05	0.11**	0.12**	0.16**	0.16**	0.03***	0.08*	0.07*
AR_discount	0.06	-0.02	-0.08	0.13**	-0.03	-0.05	0.00	0.00	-0.06	-0.09**	0.01	0.00	-0.01	-0.03***	0.00	-0.04

Table 5: Types of Financing, by Firm Type, Means (Percentages)

See Table 1 for variable definitions. The minimum age of firms in our sample is 4 years. Bank financing includes both domestic and foreign banks. "Other" includes and other sources of financing. In Panel B, *, **, and *** indicate significance of the mean difference at the 1%, 5%, and 10% level, respectively.

Panel A: All Firms

	Obs.	Bank	Trade Credit	Family & Informal Sources	Retained Earnings & Equity	Other
<i>All firms</i>	1,664	29.16	2.43	7.98	17.13	43.30
<i>By age</i>						
4-7	452	24.31	1.61	13.08	18.73	42.28
8-13	597	25.80	3.82	7.33	20.20	42.85
>13	615	35.99	1.68	4.87	12.98	44.48
<i>By size</i>						
< 50	478	14.94	1.17	12.29	17.32	54.28
51-100	280	21.08	1.84	12.20	18.60	46.28
101-250	353	32.82	3.29	5.91	19.09	38.90
> 250	553	43.21	3.27	3.45	14.97	35.10
<i>By Ownership</i>						
Foreign	125	26.38	8.30	2.42	16.29	46.61
State	362	39.11	0.25	2.94	9.32	48.39
Domestic private	1,177	26.40	2.48	10.13	19.62	41.38

Panel B: by Extension of Trade Credit

	<i>AR_d = 0</i>				<i>AR_d = 1</i>			
	Obs.	Bank	Trade Credit	Family & informal sources	Obs.	Bank	Trade Credit	Family & informal sources
<i>All firms</i>	969	27.97	1.14	8.19	626	30.37	4.43***	7.88
<i>By age</i>								
4-7	260	25.15	0.82	11.81	170	23.16	3.02**	15.25
8-13	322	23.68	1.51	8.77	256	28.45	6.34***	5.67
>13	387	33.43	1.03	5.27	200	38.96	3.18**	4.44
<i>By size</i>								
< 50	311	14.85	0.43	12.21	137	14.80	2.58**	13.13
51-100	162	21.46	1.01	10.50	109	19.83	3.23	14.48
101-250	199	32.00	1.84	7.33	142	33.83	4.89**	4.41
> 250	297	42.56	1.47	3.29	238	42.10	5.77***	3.91
<i>By Ownership</i>								
Foreign	52	22.00	1.60	4.81	70	29.57	13.64***	0.74
State	226	36.71	0.20	2.26	114	39.37	0.39	4.84
Domestic private	691	25.56	1.41	10.38	442	28.18	4.01***	9.79

Table 6: The Relationship between Trade Credit Demand and Market Power and Competition

The reported estimates are from logit (Columns 1-4) and probit (Columns 5-8) regressions. See Table 1 for variable definitions. All regressions include 12 sector dummies and 17 city dummies. Robust p-values are shown in parentheses, ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	AR_d	AR_d	AR_d	AR_d	AR_per	AR_per	AR_per	AR_per
L_Age	-0.24 [0.01]***	-0.19 [0.02]**	-0.14 [0.00]***	-0.17 [0.03]**	-0.18 [0.00]***	-0.14 [0.00]***	-0.14 [0.00]***	-0.14 [0.00]**
L_emp	0.16 [0.00]***	0.10 [0.01]**	0.10 [0.00]***	0.09 [0.02]**	0.13 [0.00]***	0.09 [0.00]***	0.10 [0.00]***	0.07 [0.00]***
D_Foreign	0.55 [0.03]**	0.34 [0.10]*	0.14 [0.24]	0.34 [0.09]*	0.22 [0.13]	0.08 [0.50]	0.14 [0.24]	0.10 [0.40]
D_State	-0.11 [0.48]	-0.10 [0.49]	-0.02 [0.78]	-0.12 [0.39]	0.02 [0.78]	0.03 [0.76]	0.02 [0.78]	0.01 [0.95]
D_Export	0.33 [0.16]	0.35 [0.07]*	0.39 [0.04]**	0.34 [0.08]*	-0.06 [0.68]	-0.06 [0.64]	-0.06 [0.61]	-0.04 [0.71]
Saleslargest_5	0.21 [0.08]*				0.14 [0.07]*			
Compmktshare_1		0.21 [0.07]*				0.16 [0.04]**		
Lower_price			0.56 [0.00]***				0.33 [0.00]***	
New_product				0.32 [0.00]***				0.25 [0.00]***
Constant	-2.94 [0.00]***	-1.92 [0.00]***	-2.13 [0.00]***	-1.92 [0.00]***	-1.95 [0.00]***	-1.65 [0.00]***	-1.50 [0.00]***	19.48 [0.03]**
Observations	1,611	1,974	2,011	2,016	1,623	2,000	2,038	2,040
R-squared								

Table 7: The Relationship between Trade Credit Demand and Trade Credit Supply

The reported estimates are from logit (Columns 1-2 and 5-8) and probit (Columns 3-4) regressions. Columns 5-8 include only the subsample of firms that use accounts receivable. See Table 1 for variable definitions. All regressions include 12 sector dummies and 17 city dummies. Robust p-values are shown in parentheses, ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>AR_d</i>	<i>AR_d</i>	<i>AR_per</i>	<i>AR_per</i>	<i>AR_days</i>	<i>AR_days</i>	<i>AR_discount</i>	<i>AR_discount</i>
L_Age	-0.13 [0.11]	-0.16 [0.06]*	-0.15 [0.00]***	-0.15 [0.00]**	-0.21 [0.14]	-0.21 [0.13]	-0.09 [0.59]	-0.11 [0.50]
L_emp	0.06 [0.15]	0.06 [0.16]	0.07 [0.01]***	0.06 [0.02]**	0.07 [0.35]	0.06 [0.37]	-0.03 [0.75]	-0.03 [0.72]
D_Foreign	0.39 [0.07]*	0.38 [0.07]*	0 [1.00]	0 [0.99]	-0.14 [0.59]	-0.19 [0.48]	0.17 [0.66]	-0.22 [0.56]
D_State	-0.03 [0.85]	-0.03 [0.84]	0.04 [0.64]	0.06 [0.52]	0.14 [0.57]	0.16 [0.49]	0.16 [1.58]	-0.13 [0.65]
D_Export	-0.33 [0.10]*	-0.37 [0.06]*	-0.01 [0.094]	-0.03 [0.83]	0.47 [0.12]	0.46 [0.13]	-0.75 [0.09]*	-0.66 [0.12]
LC_unused	0.16 [0.51]		0.07 [0.70]		0.24 [0.54]		-0.11 [0.79]	
Profitable		0.07 [0.54]		0.08 [0.29]		0.05 [0.77]		-0.28 [0.19]
AP_d	1.41 [0.00]***	1.44 [0.00]***						
AP_per			0.02 [0.00]***	0.02 [0.00]***				
AP_days					0.38 [0.11]	0.35 [0.14]		
AP_discount							1.25 [0.00]***	1.25 [0.00]***
Constant	-2.96 [0.00]***	-2.72 [0.00]***	-1.49 [0.00]***	-1.7 [0.00]***	1.37 [0.24]**	-0.27 [0.78]	-17.8	-0.9 [0.47]
Observations	1,881	1943	1,869	1925	740	765	725	771
R-squared	0.13	0.13	0.14	0.14	0.09	0.09	0.12	0.13

**Table 8: The Financing of Trade Credit Supply:
Is Trade Credit Demand More Important for Credit Constrained Firms?**

The reported estimates are from logit (Columns 1-2) and probit (Columns 3-4) regressions. See Table 1 for variable definitions. All regressions include 12 sector dummies and 17 city dummies. Robust p-values are shown in parentheses, ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
	<i>AR_d</i>	<i>AR_d</i>	<i>AR_per</i>	<i>AR_per</i>
L_Age	-0.13 [0.11]	-0.16 [0.06]*	-0.15 [0.00]***	-0.15 [0.00]***
L_emp	0.06 [0.15]	0.06 [0.16]	0.07 [0.01]***	0.06 [0.02]**
D_Foreign	0.39 [0.07]*	0.38 [0.07]*	0.01 [0.95]	0 [1.00]
D_State	0.03 [0.85]	0.03 [0.83]	0.04 [0.65]	0.06 [0.52]
D_Export	-0.33 [0.10]*	-0.37 [0.06]*	-0.01 [0.90]	-0.03 [0.83]
AP_d	1.4 [0.00]***	1.48 [0.00]***		
AP_per			0.02 [0.00]***	0.02 [0.00]***
LC_unused	0.11 [0.78]		0.23 [0.20]	
LC*AP_d	10.32 [0.84]			
LC*AP_per			-0.77 [0.11]	
Profitable		0.1 [0.49]		0.08 [0.30]
Profit*AP_d		-0.07 [0.73]		
Profit*P_per				0 [0.92]
Constant	-2.96 [0.00]***	-2.74 [0.00]***	-1.49 [0.00]***	-1.7 [0.00]***
R-squared	1,881	1,943	1,986	1,925
Observations	0.13	0.13	0.14	0.14

**Table 9: The Financing of Trade Credit Supply:
Is Trade Credit Demand More Important in Competitive Markets?**

The reported estimates are from logit (Columns 1-2) and probit (Columns 3-4) regressions. See Table 1 for variable definitions. All regressions include 12 sector dummies and 17 city dummies. Robust p-values are shown in parentheses, ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
	<i>AR_d</i>	<i>AR_d</i>	<i>AR_per</i>	<i>AR_per</i>
L_Age	-0.23 [0.02]**	-0.3 [0.01]***	-0.18 [0.00]***	-0.2 [0.00]***
L_emp	0.09 [0.06]*	0.09 [0.14]*	0.1 [0.00]***	0.09 [0.01]**
D_Foreign	0.54 [0.04]**	0.6 [0.03]**	0.14 [0.35]	0.27 [0.09]*
D_State	-0.04 [0.82]	0.13 [0.53]	0.06 [0.54]	0.1 [0.41]
D_Export	-0.23 [0.32]	-0.34 [0.19]	-0.02 [0.88]	-0.15 [0.33]
AP_d	1.22 [0.00]***	1.34 [0.00]***		
AP_per			0.01 [0.00]***	0.01 [0.00]***
Saleslargest_5	0.03 [0.85]		0.03 [0.69]	
Sales*AP_d	0.47 [0.05]*			
Sales*AP_per			0 [0.55]	
Bi_mktpower		-0.43 [0.07]*		-0.13 [0.22]
Bi*AP_d		0.75 [0.02]**		
Bi*AP_per				0.01 [0.00]***
Constant	-2.77 [0.00]***	-2.78 [0.00]***	-1.10 [0.00]***	-2.02 [0.00]***
Observations	1,547	1,080	1,529	1,072
R-squared	0.16	0.15	0.18	0.13

Table 10: Ex-post Matching of Trade Credit Terms

The reported estimates are from multinomial logit regressions ($AR_gap=0$ is the base outcome). See Table 1 for variable definitions. All regressions include 12 sector dummies and 17 city dummies. Robust p-values are shown in parentheses, ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>AP_gap</i>					
	= - 1			= + 1		
L_Age	-0.04 [0.83]	-0.02 [0.93]	-0.02 [0.93]	-0.41 [0.03]**	-0.38 [0.04]**	-0.41 [0.03]**
L_emp	0.17 [0.11]	0.16 [0.14]	0.16 [0.14]	0.12 [0.21]	0.12 [0.20]	0.12 [0.19]
D_Foreign	0.27 [0.52]	0.31 [0.47]	0.30 [0.48]	-0.19 [0.65]	-0.24 [0.56]	-0.25 [0.54]
D_State	-0.2 [0.59]	-0.11 [0.76]	-0.12 [0.75]	-0.36 [0.30]	-0.33 [0.33]	-0.36 [0.30]
D_Export	0.23 [0.62]	0.31 [0.51]	0.33 [0.49]	-0.53 [0.24]	-0.55 [0.23]	-0.53 [0.25]
AR_gap	0.29 [0.22]	0.37 [0.12]	0.35 [0.14]	0.56 [0.01]***	0.53 [0.01]**	0.53 [0.01]***
LC_unused	0.5 [0.37]			-0.45 [0.40]		
Profit_d		0.29 [0.30]	0.29 [0.30]		0.03 [0.90]	0.03 [0.91]
AP_discount			0.17 [0.74]			0.90 [0.04]**
Constant	-22.45 [0.00]***	-23.89 [0.00]***	-23.91 [0.00]***	0.36 [0.75]	-0.29 [0.78]	-0.42 [0.69]
Observations	593	602	602	593	602	602
Pseudo R-squared	0.23	0.22	0.23	0.23	0.22	0.22

Table 11: Other Determinants of Trade Credit Supply: Collateral Value, Customer Creditworthiness and Legal Institutions

The reported estimates are from logit (Columns 1-6) and probit (Columns 7-12) regressions. See Table 1 for variable definitions. All regressions include 12 sector dummies and 17 city dummies. Robust p-values are shown in parentheses, ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>AR_d</i>	<i>AR_d</i>	<i>AR_d</i>	<i>AR_d</i>	<i>AR_per</i>	<i>AR_per</i>	<i>AR_per</i>	<i>AR_per</i>
L_Age	-0.13 [0.14]	-0.10 [0.25]	-0.11 [0.18]	-0.14 [0.13]	-0.14 [0.01]**	-0.12 [0.02]**	-0.14 [0.01]**	-0.14 [0.01]**
L_emp	0.04 [0.35]	0.05 [0.31]	0.05 [0.28]	0.07 [0.12]	0.07 [0.02]**	0.05 [0.11]	0.06 [0.02]**	0.08 [0.01]**
D_Foreign	0.43 [0.05]**	0.42 [0.05]*	0.39 [0.07]*	0.34 [0.13]	0.03 [0.80]	0.01 [0.94]	0.00 [0.99]	0.02 [0.90]
D_State	0.01 [0.97]	0.00 [1.00]	0.01 [0.96]	0.00 [1.00]	0.052 [0.59]	0.06 [0.51]	0.05 [0.57]	0.07 [0.50]
D_Export	-0.35 [0.09]*	-0.31 [0.13]	-0.31 [0.12]	-0.31 [0.14]	-0.01 [0.93]	0.00 [0.99]	0.01 [0.94]	0.01 [0.96]
AP_d	1.42 [0.00]**	1.36 [0.00]**	1.41 [0.00]**	1.29 [0.00]**				
AP_per					0.02 [0.00]**	0.01 [0.00]**	0.02 [0.00]**	0.01 [0.00]**
LC_unused	0.28 [0.30]	0.19 [0.46]	0.20 [0.45]	0.28 [0.31]	0.10 [0.56]	0.08 [0.65]	0.07 [0.69]	0.10 [0.57]
Uniqueness	0.00 [0.68]				0.00 [0.62]			
Certified_Products		0.00 [0.22]				0.00 [0.02]**		
Contracts			0.43 [0.02]**				0.22 [0.05]*	
Property_rights				-0.00 [0.57]				0.00 [0.88]
Constant	-2.49 [0.00]**	-2.92 [0.00]**	-3.28 [0.00]**	-2.89 [0.00]**	-1.39 [0.00]**	-1.35 [0.00]**	-2.03 [0.00]**	-1.44 [0.00]**
Observations	1,766	1,748	1,865	1,655	1,756	1,738	1,857	1,640
R-squared	0.13	0.13	0.13	0.12	0.14	0.14	0.14	0.14