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

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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 (accounts receivable) and received from suppliers (accounts payable). 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 o suppliers, while firms that receive late payments from customers are more likely to remit late to their own 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, 2002). 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 accounts receivable (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. Lastly, 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 (accounts receivable) as well as the receipt of trade credit by firms from their own suppliers (accounts payable).

To our knowledge, this is the first firm-level data set providing detailed and rich information on both the market environment and contract features of supplier and customer "supply-chain" financing. 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 seems to be affected by the availability of internal resources and the use of informal credit. Firms with positive retained earnings are less likely to rely on accounts payable while firms using more costly informal sources of financing are more dependent on their own receipt of supplier financing to extend credit to their own customers. In addition, 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 (late) from customers are significantly more likely to remit early (late) 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 take trade credit.

With the exception of a theoretical study by 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 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 and Rajan, 1995), in industries where moral hazard problems are tighter (Burkart, Ellingsen, and Giannetti,

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

2006), in countries with weaker lending environments (Petersen and Rajan, 1995; Demirguc-Kunt and Maksimovic, 2002; 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 of the supplier as a lender of last resort.

However, this does not explain the large use of trade credit by listed companies, which generally have access to both public and private financial markets (Demirguc-Kunt and Maksimovic 2002), and the common extension of trade credit by small, more credit constrained firms. For instance, using the complete *World Bank Enterprise Surveys* database, which includes a sample of over 40,000 mostly small and medium sized firms surveyed in over 50 mostly developing countries around the world, we find that 69% of all firms report selling goods on credit, while 51% use trade credit financing (compared to 62% of firms that have access to bank financing).[3] 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, 2005). In 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).

Our paper takes a holistic approach to supply chain decisions – between firms and both their customers and suppliers – and offers an important extension to previous literature. We find that firms rely mostly on accounts payable to finance accounts receivable – and not bank financing – and typically match credit terms between

[3] Author's estimations.

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.

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 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, 2006). 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.

We are confident that our results shed light on the determinants of trade credit in general and not only for the case of China. First, the average use of trade credit in China is very similar to other developed and developing countries. For example, using the complete Enterprise Survey database of over 70 countries, we find that the average number of firms using trade credit for working capital or investment purposes (the only comparative variable available across countries) is 47% in China, and 51% for the complete sample. Similarly, the average percentage of trade credit used for working capital purposes (averaged across firms that use trade credit) is 48% of total working capital financing in China, versus 37% for the complete sample. Second, although there are unique features of the Chinese economy, such as the large role of the state and a weakly developed financial system, there are no country-specific regulations on inter-firm financing and we carefully address related potential biases. Third, when we replicate our main results using data for Brazil, we find additional support for both the market power and the matching story found in China.[4]

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. Section 5 discusses our results and addresses some related issues. Section 6 concludes.

[4] Unfortunately data for Brazil does not include as detailed information on supply chain contracts; therefore, we use data for Brazil as only a further robustness check for the evidence found in China.

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.[5] 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.[6] 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.[7] 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 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.

[5] The survey instrument and data are available at: www.enterprisesurveys.org.
[6] Detailed questions on supply chain terms were not asked in any other country survey.
[7] We exclude from our sample 157 firms that provide financial services.

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 39% of the firms in our sample offer trade credit, and that the average percentage of goods sold on credit is 14% (*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 value of *AR_days* is 30 days). Finally, we find that 20% of firms that offer trade credit offer a prepayment discount on credit to its customers (*AR_discount*). 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 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, accounts payable (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 7% 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*).[8] 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 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,

[8] The minimum age of firms in the sample was restricted to four.

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 23% 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 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*). A value equal to one suggests that the firm's largest customer is important to its overall revenue and that the firm's market power is weak, relative to its customers. Second, we measure the importance of the firm for its largest customer with a dummy variable equal to one if the number of suppliers used by the firm's largest customer is greater than 5 (the median), and 0 otherwise (*Suplcust_5*). In other words, a value equal to one implies that the customer is less dependent on the firm – i.e. ending the relationship poses less of a risk of a holdup problem – and consequently less market power for the firm, relative to its customers. Third, we measure the importance of the firm's main competitor in the product market with a dummy variable equal to one if the firm's main competitor's share in the domestic market for the firm's most important product is greater than 1% (the median), and 0 otherwise (*Compmktshare_1*). This value proxies for market

competitiveness; a value of one connotes weaker market power, relative to the firm's competitors (and buyers).

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 variable 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 <u>both</u> sides of the markets are 1205: 29% of firms have weak bargaining power relative to their customers <u>and</u> 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 two dummy variables equal

to one if the firm uses local or foreign bank financing (*D_Bank*) and family or informal credit (*D_Fam_Informal*). Finally, we measure the availability of internal resources by using a dummy variable equal to one if the firm uses retained earnings to financing working capital or investment (*D_RE*). Bivariate tests find that firms that extend trade credit are significantly more likely to have a larger unused line of credit and positive retained earning.

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. In a developing country such as China, legal contracts and confidence in the judicial system to enforce contracts could be all important indicators in the decision to extend credit. Legal institutions matter when contracts are written and disputes between parties arise. We thus 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*).

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 negotiate 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 most firms in our sample do not consider the legal system as a major constraint to doing business.[9] This variable is defined at the firm-level and therefore reflects how the firm *perceives* the quality of legal

[9] 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.

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 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.

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 patters 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.[10]

[10] Additional industries available upon request.

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:

Accounts Receivable (AR) indicators = f {Firm characteristics, Market Power indicators} {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 retained earnings. 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. Finally, firms could also rely on family and informal loans.

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:

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

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 or firms with less access to internal and external financing depend more on matching the terms of their accounts receivable and accounts payable. 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 accounts receivable 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 accounts payable 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. For instance, the larger the number of suppliers of the firm's most important customer, the larger the market share of competitors and the larger the percentage of sales to the largest customer, the more 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, 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.[11]

Firms have different channels to finance the supply of trade credit, such as external financing (bank credit or informal sources), internal resources (retained earnings), or alternatively, credit from suppliers (accounts payable). Next, we examine the importance of a firm's access to finance from its own suppliers on its decision to extend credit to its customers, after controlling for other potential sources of accounts receivable financing. Table 7 documents the relevance of each source of financing. As shown in Panel A, unused bank credit lines (*LC_unused*) does not appear to have an

[11] Our results hold after controlling for the number of customers. The coefficient of this variable is positive and significant, suggesting that firms with a larger number of customers are more likely to offer trade credit or sell a larger percentage of their goods on credit. We do not show these regressions since the number of customers also appears to proxy for firm size and is highly correlated with our control variables.

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.[12] We also include dummy variables indicating that the firm uses retained earnings, bank financing, and informal or family sources of financing. Panel B shows consistently that after even including these variables, only matching accounts payable terms are significant.[13] Our results are also robust to the inclusion of a dummy indicating positive profitability (not shown).

The most intriguing finding of Table 7 is that firms use accounts payable to finance the provision of accounts receivable 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; and whether the firm is offered a discount by its suppliers and offers a discount to its customers.

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 shows our results. The interaction terms between the use of accounts payables and *LC_unused* and our *D_bank* dummy are never statistically significant, suggesting that the decision to use accounts payable to finance accounts receivables does not depend on access to bank financing. The same results are also found if we include the smaller sample of trade credit terms (maturity and prepayment discounts, not shown).

[12] Note that the regressions using trade credit terms – *AR_days* and *AR_discount* – only include firms that offer trade credit (i.e *AR_d*=0).
[13] All results in Table 7 are robust to the exclusion of accounts payable terms.

However, we find a significant effect of the interaction of the percentage of goods sold on credit and our bank dummy, suggesting that firms with access to bank financing rely less on accounts payable to finance the provision of trade credit to their own customers.

Table 8 also includes the interaction of accounts payable terms and dummies indicating the use of retained earnings and informal sources of financing. In this case, we find some interesting significant terms: the coefficient on the interaction of accounts payable and retained earnings is significantly positive, while the interaction of accounts payable and informal financing is significantly negative. These results suggest that whereas retained earnings might be used to finance the extension of trade credit, firms that use more costly informal sources of financing are more dependent on their own receipt of supplier financing to extend credit to their own customers

Table 9, however, shows that the extent to which firms match accounts payable with accounts receivable does depend on the bargaining power enjoyed simultaneously in the input and 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.[14]

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

[14] 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.

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 construct two dummy variables (*D1_AR_gap*) and (*D2_AR_gap*) which take values equal to one if *AR_gap* is equal to one (customers pay in advance) and negative one (customers pay late), respectively, and zero otherwise. We also control for external and internal resources through *LC_unused* and retained earnings (*D_RE*).

The share of unused bank credit and having internal funds (retained earnings) are never significant in determining early or late payments. However, we find strong statistical significance for our matching maturity story. Columns 1-3 show that firms are significantly more likely to pay their suppliers late if their customers remit late and, similarly, 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). 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.

Finally, 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, having a larger share of goods made to clients' unique specification – i.e. outputs

with low collateral value – does not effect the use or share of trade credit (*Uniqueness*). This variable might also proxy for customer opportunism (see Burkart and Ellingsen 2004, Burkart et al. 2006 and Cunat 2006), for instance, the lower diversion value of the transacted goods. But our findings do not provide empirical support for either of these alternative interpretations. However, entering into written contracts with clients and having a higher percentage of certified product increases the likelihood to offer and the share of trade credit, respectively. 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.

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 property rights seems to have no significant impact on trade credit supply. 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.

Finally, we perform a series of robustness tests. We find that our results still hold if we restrict the sample to only manufacturing firms, profitable firms (*Profit_d=1*), to firms with a state ownership (national, state, and local, and cooperative/collective enterprises) lower than 50% (*D_State=0*), or to non-exporter firms (*D_Export=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).[15]

Next, although our data set generally provides only cross-sectional firm-level data for one year, some questions in the survey refer to past firm activity. These questions allow us to control for some changes in firm policy that 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. We 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. Discussion

The evidence presented in the previous section raises some important questions. Why, for example, contrary to previous literature, our main measure of credit constraints (LC_unused) does not seem to affect the decision to offer trade credit both directly or indirectly through the interactions with accounts payable. A possible explanation could be that the percentage of unused credit lines does not necessarily capture the tightness of credit constraints. Firms have to pay fees on the proportion of unused credit lines and therefore have incentives to reduce the unused portion. It follows that a fully used credit line does not necessarily identify a credit constrained firm. However, when instead we

[15] Regression results available upon request.

include a dummy indicating the availability of bank credit (both from local and foreign commercial banks), we find that firms with external bank finance are more likely tosell a larger percentage of goods on credit, but again no significant effect is found for the decision to extend credit.

Another possible explanation could be that trade credit is not necessarily more expensive than bank credit. The central question then becomes how costly trade credit is, relative to bank financing. Conventional wisdom is that trade credit is primarily a financing of "last resort" for firms that have exhausted or unable to access bank credit. However, some more recent papers challenge this view. For example, Giannetti, Burkart and Ellingsen (2006) document that a majority of the U.S. frms in their sample appear receive cheap trade credit. Similarly, Miwa and Ramseyer (2005) argue that there is no evidence that sellers use "extravagant cash discount' in Japan, while Marotta (2005) document that trade credit provided by Italian manufacturing firms is only slightly if at all more expensive than bank credit. Our findings are in line with this recent evidence. .

Furthermore, our survey allows us to calculate the implicit cost of trade credit offered (AR_cost) using information on the discount offered for cash payment and the number of days before the supplier imposes penalties. Table 12 provides summary statistics on this rate and on the interest rate charged by banks (*Bank_cost)*. The evidence is intriguing for several reasons. We find that 10% of firms in our sample receive an implicit rate lower than 4% and 25% an implicit rate lower than 10%; the median implicit rate in our sample is 27%. Next, we examine the spread between the cost of bank financing and trade credit, accounting for annual fees that banks charge borrowers (*Diff_AR_Bank_fee*). We find that for over 20% of firms in our sample trade credit is

indeed cheaper than bank loan. In addition, for over 40% of firms in our sample, the difference between the two rates is below 10 percentage points. Although we are unable to precisely measure the cost of trade credit, this evidence suggests that large firms might use trade credit as a relatively cheap source of working capital financing.

A second important issue to address is that our analysis does not address the *causality* issue between payables and receivable, i.e. which of the two decisions – the offer of trade credit to customers or the demand of trade credit from suppliers – do firms make first? We take a first step in addressing this issue by estimating a simultaneous-equation-model where we let accounts receivable (*AR_d* and *AR_per*) depend on accounts payable (*AP_d* and *AP_Per*) and vice versa (after controlling for the usual firm characteristics, sector and city heterogeneity).[16] The results show that accounts payable depend significantly and positively on accounts receivables, while accounts receivable are significantly related only to the degree of competition in the product market – but not on accounts payable (not shown). We interpret these findings as suggestive that firms decide *first* whether to offer trade credit to their customers, depending on the product market structure. This would suggest that firms first decide to offer customers delayed payments, and then decide to purchase inputs on credit, perhaps in order to use their payables to finance the provision of receivables. We interpret this evidence as further support to our competition-matching story.

Finally, if competition is a main driver behind the decision to offer trade credit, why do firms not simply reduce the product price? In many developed countries, laws prohibit firms from selling identical products to customers at different prices (i.e. the Clay Act in the U.S.) However, China has no such laws. Alternatively, if firms are able

[16] We use as identification condition the market structure of the input and output markets.

to finance their extension of accounts receivable with accounts payable, firms might be able to both increase their total assets (relative to a price discount), and reduce their leverage ratio (i.e. total debt), which might be favorable for loan officers and equity analysts. We leave a more in depth discussion of these institutional questions to future research.

6. 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 and to match credit terms between accounts payable and accounts receivable, in particular firms with stronger market power 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.

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Table 1: Variable Definitions and Mean Statistics

Variable Name	Definition	Mean
	Measures of Trade Credit	
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
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 paysits suppliers on time); and =-1 if the difference is less than zero (i.e. the firms pays its suppliers late)	0.09
	General Firm Characteristics	
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

Indicators of (Weaker) Market Power of the Seller (relative to its Customers)		
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
Suplcust_5	Dummy (0/1), =1 if the number of suppliers used by the firm's largest customer is greater than 5, and 0 otherwise	0.44
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 *Saleslargest_5* = 1), and the firm is its largest supplier's most important customer, =0 otherwise.	0.29
Financial Characteristics		
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
D_Bank	Dummy (0/1), = 1 if the firm uses local or foreign bank financing for working capital or investment	0.49
D_RE	Dummy (0/1), = 1 if the firm uses retained earnings for working capital or investment	0.36
D_Fam_Informal	Dummy (0/1), = 1 if the firm uses family or informal financing for working capital or investment	0.20
Other Firm Characteristics		
Property_rights	The likelihood (%) that the legal system will uphold contracts and property rights in business disputes	63.20
Uniqueness	The percent of sales made to clients' unique specification (i.e. that cannot be sold to other clients)	37.53
Certified_dum	Dummy (0/1), =1 if the firm has profits greater than zero, =0 otherwise	0.57
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
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
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
Suplcust_5	1,646	0.44	0.50	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
D_Bank	1,549	0.49	0.50	0.00	1.00
D_RE	1,457	0.36	0.48	0.00	1.00
D_Fam_Informal	1,421	0.20	0.40	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
Contract	2,216	0.88	0.33	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_days	0.16	0.36	***
AP_discount	0.05	0.09	**
AP_gap	0.07	0.12	
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	***
Suplcust_5	0.42	0.56	***
LC_unused	0.06	0.09	***
D_Bank	0.49	0.52	
D_RE	0.33	0.42	***
D_Fam_Informal	0.20	0.21	
Property_rights	63.20	66.76	**
Uniqueness	37.45	37.60	
Contract	0.85	0.93	***

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

Panel B: Dependent Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
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**
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**
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*
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

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
All firms	1,664	29.16	2.43	7.98	17.13	43.30
By age						
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
By size						
< 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
By Ownership						
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

	AR_d = 0				***AR_d = 1***			
	Obs.	***Bank***	***Trade Credit***	***Family & informal sources***	**Obs.**	***Bank***	***Trade Credit***	***Family & informal sources***
All firms	969	27.97	1.14	8.19	626	30.37	4.43***	7.88
By age								
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
By size								
< 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
By Ownership								
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 Supply and Market Power and Competition

The reported estimates are from logit (Colums 1-5) and probit (Columns 6-10) 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)	(9)	(10)
	AR_d	AR_d	AR_d	AR_d	AR_d	AR_per	AR_per	AR_per	AR_per	AR_per
L_Age	-0.24	-0.19	-0.14	-0.17	-0.24	-0.18	-0.14	-0.14	-0.14	-0.18
	[0.01]***	[0.02]**	[0.00]***	[0.03]**	[0.01]***	[0.00]***	[0.00]***	[0.00]***	[0.00]**	[0.00]***
L_emp	0.16	0.10	0.10	0.09	0.16	0.13	0.09	0.10	0.07	0.13
	[0.00]***	[0.01]**	[0.00]***	[0.02]**	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***
D_Foreign	0.55	0.34	0.14	0.34	0.55	0.22	0.08	0.14	0.10	0.22
	[0.03]**	[0.10]*	[0.24]	[0.09]*	[0.03]**	[0.13]	[0.50]	[0.24]	[0.40]	[0.13]
D_State	-0.11	-0.10	-0.02	-0.12	-0.11	0.02	0.03	0.02	0.01	0.03
	[0.48]	[0.49]	[0.78]	[0.39]	[0.48]	[0.78]	[0.76]	[0.78]	[0.95]	[0.78]
D_Export	0.33	0.35	0.39	0.34	-0.329	-0.06	-0.06	-0.06	-0.04	-0.06
	[0.16]	[0.07]*	[0.04]**	[0.08]*	[0.16]	[0.68]	[0.64]	[0.61]	[0.71]	[0.68]
Saleslargest_5	0.21					0.14				
	[0.08]*					[0.07]*				
Compmktshare_1		0.21					0.16			
		[0.07]*					[0.04]**			
Lower_price			0.56					0.33		
			[0.00]***					[0.00]***		
New_product				0.32					0.25	
				[0.00]***					[0.00]***	
Suplcust_5					0.21					0.14
					[0.08]*					[0.07]*
Constant	-2.94	-1.92	-2.13	-1.92	-2.94	-1.95	-1.65	-1.50	-1.948	-1.9473
	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.03]**	[0.00]***
Observations	1,611	1,974	2,011	2,016	1,611	1,623	2,000	2,038	2,040	1623
Pseudo R-squared	0.09	0.08	0.09	0.08	0.07	0.12	0.10	0.11	0.11	0.09

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

The reported estimates are from logit,estimations, except for Columns (2) and (6), which are probit estimations. Columns (3-4) and (7-8) 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)
	Unused Line of Credit (LC_Unused)				*Bank Financing (D_Bank)*			
	AR_d	*AR_per*	*AR_discount*	*AR_days*	*AR_d*	*AR_per*	*AR_discount*	*AR_days*
L_Age	-0.13	-0.15	-0.06	-2.09	-0.25	-0.15	0.14	-2.62
	[0.11]	[0.00]***	[0.76]	[0.50]	[0.01]**	[0.01]**	[0.54]	[0.47]
L_emp	0.06	0.07	-0.03	0.56	0.08	0.07	-0.11	1.82
	[0.15]	[0.01]***	[0.76]	[0.73]	[0.11]	[0.03]**	[0.36]	[0.33]
D_Foreign	0.39	0.00	0.03	-4.06	0.47	0.01	0.34	-3.69
	[0.07]*	[1.00]	[0.93]	[0.54]	[0.05]*	[0.96]	[0.44]	[0.61]
D_State	-0.03	0.04	-0.15	-5.78	-0.00	0.05	-0.17	-14.09
	[0.85]	[0.64]	[0.63]	[0.28]	[0.98]	[0.62]	[0.69]	[0.03]**
D_Export	-0.33	-0.01	-0.87	9.87	-0.52	-0.12	-0.45	7.48
	[0.10]*	[0.094]	[0.06]*	[0.18]	[0.02]**	[0.41]	[0.34]	[0.35]
LC_unused	0.16	0.07	-0.13	5.80				
	[0.51]	[0.70]	[0.77]	[0.50]				
D_Bank					-0.08	-0.07	0.45	7.96
					[0.55]	[0.38]	[0.11]	[0.09]*
AP_d	1.41				1.36			
	[0.00]***				[0.00]***			
AP_per		0.02				0.01		
		[0.00]***				[0.00]***		
AP_discount			1.30				0.59	
			[0.00]***				[0.17]	
AP_days				0.10				0.11
				[0.02]**				[0.03]**
Constant	-2.96	-1.49	-19.37	64.48	-3.16	-1.74	-0.41	73.42
	[0.00]***	[0.00]***	[0.00]***	[0.01]***	[0.00]***	[0.00]***	[0.83]	[0.00]***
Observations	1,881	1,869	646	556	1299	1291	477	409
Pseudo R-squared	0.13	0.14	0.13	0.01	0.15	0.14	0.17	0.01

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

The reported estimates are from logit (Colums 1 and 3), probit (Column 2) and tobit (Columns 4-6) 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)
	Retained Earnings (D_RE)				*Family & Informal Financing (D_Fam_Inf)*			
	AR_d	*AR_per*	*AR_discount*	*AR_days*	*AR_d*	*AR_per*	*AR_discount*	*AR_days*
L_Age	-0.19	-0.13	0.18	-4.62	-0.22	-0.14	0.13	-2.02
	[0.08]*	[0.05]**	[0.49]	[0.22]	[0.04]**	[0.04]**	[0.61]	[0.59]
L_emp	0.06	0.05	-0.08	2.26	0.08	0.06	-0.07	2.46
	[0.27]	[0.12]	[0.54]	[0.22]	[0.16]	[0.06]*	[0.57]	[0.18]
D_Foreign	0.60	0.05	0.29	-8.56	0.51	-0.02	0.36	-6.55
	[0.02]**	[0.75]	[0.52]	[0.23]	[0.06]*	[0.90]	[0.45]	[0.37]
D_State	0.02	0.14	-0.41	-15.03	-0.03	0.14	-0.51	-18.89
	[0.91]	[0.22]	[0.39]	[0.02]**	[0.86]	[0.24]	[0.29]	[0.00]***
D_Export	-0.40	-0.08	-0.42	5.67	-0.47	-0.08	-0.28	8.38
	[0.10]	[0.59]	[0.41]	[0.46]	[0.05]*	[0.61]	[0.58]	[0.29]
D_RE	0.14	0.05	0.29	-2.08				
	[0.32]	[0.59]	[0.31]	[0.65]				
D_Fam_Inf					-0.13	0.00	-0.36	6.47
					[0.47]	[0.98]	[0.34]	[0.25]
AP_d	1.50				1.44			
	[0.00]***				[0.00]***			
AP_per		0.01				0.01		
		[0.00]***				[0.00]***		
AP_discount			0.54				0.64	
			[0.25]				[0.16]	
AP_days				0.13				0.14
				[0.01]***				[0.00]***
Constant	-3.26	-1.80	-1.14	40.54	-2.90	-1.81	0.44	52.36
	[0.00]***	[0.00]***	[0.54]	[0.15]	[0.00]***	[0.00]***	[0.77]	[0.06]*
Observations	1,207	1,203	453	388	1,187	1,182	445	381
Pseudo R-squared	0.16	0.16	0.18	0.01	0.15	0.15	0.17	0.02

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

The reported estimates are from logit (Colums 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)	(5)	(6)	(7)	(8)
	AR_d	*AR_d*	*AR_d*	*AR_d*	*AR_per*	*AR_per*	*AR_per*	*AR_per*
L_age	-0.13	-0.25	-0.18	-0.22	-0.15	-0.15	-0.13	-0.14
	[0.11]	[0.01]**	[0.09]*	[0.04]**	[0.00]***	[0.01]**	[0.06]*	[0.04]**
L_emp	0.06	0.08	0.05	0.08	0.07	0.07	0.05	0.06
	[0.15]	[0.11]	[0.30]	[0.16]	[0.01]***	[0.03]**	[0.14]	[0.07]*
D_Foreign	0.39	0.49	0.61	0.51	0.01	0.03	0.06	0.00
	[0.07]*	[0.05]**	[0.02]**	[0.06]*	[0.95]	[0.83]	[0.71]	[0.99]
D_State	0.03	-0.02	0.01	-0.03	0.04	0.04	0.13	0.13
	[0.85]	[0.93]	[0.94]	[0.86]	[0.65]	[0.69]	[0.25]	[0.28]
D_Export	-0.33	-0.53	-0.39	-0.47	-0.01	-0.13	-0.08	-0.08
	[0.10]*	[0.02]**	[0.11]	[0.05]*	[0.90]	[0.36]	[0.60]	[0.61]
AP_d	1.40	1.53	1.72	1.44				
	[0.00]***	[0.00]***	[0.00]***	[0.00]***				
AP_per					0.02	0.02	0.02	0.01
					[0.00]***	[0.00]***	[0.00]***	[0.00]***
LC_unused	0.11				0.23			
	[0.78]				[0.20]			
LC*AP_d	0.10							
	[0.84]							
LC*AP_per					-0.01			
					[0.11]			
D_Bank		0.07				0.05		
		[0.68]				[0.56]		
D_Bank *AP_d		-0.33						
		[0.20]						
D_Bank *AP_per						-0.01		
						[0.01]***		
D_RE			0.38				0.16	
			[0.04]**				[0.09]*	
D_RE*AP_d			-0.54					
			[0.05]**					
D_RE*AP_per							-0.01	
							[0.03]**	
D_Fam_Informal				-0.11				-0.14
				[0.66]				[0.26]
D_Fam_Inf*AP_d				-0.03				
				[0.93]				
D_Fam_Inf*AP_per								0.01
								[0.05]**
Constant	-2.97	-3.27	-3.44	-2.90	-2.74	-1.98	-1.82	-1.76
	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***
Observations	1,881	1,299	1,207	1,187	1,869	1,291	1,203	1,182
Pseudo R-squared	0.13	0.15	0.17	0.15	0.14	0.15	0.16	0.16

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

The reported estimates are from logit (Colums 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)
	AR_d	*AR_d*	*AR_per*	*AR_per*
L_Age	-0.23	-0.3	-0.18	-0.2
	[0.02]**	[0.01]***	[0.00]***	[0.00]***
L_emp	0.09	0.09	0.1	0.09
	[0.06]*	[0.14]*	[0.00]***	[0.01]**
D_Foreign	0.54	0.6	0.14	0.27
	[0.04]**	[0.03]**	[0.35]	[0.09]*
D_State	-0.04	0.13	0.06	0.1
	[0.82]	[0.53]	[0.54]	[0.41]
D_Export	-0.23	-0.34	-0.02	-0.15
	[0.32]	[0.19]	[0.88]	[0.33]
AP_d	1.22	1.34		
	[0.00]***	[0.00]***		
AP_per			0.01	0.01
			[0.00]***	[0.00]***
Saleslargest_5	0.03		0.03	
	[0.85]		[0.69]	
Sales*AP_d	0.47			
	[0.05]*			
Sales*AP_per			0.00	
			[0.55]	
Bi_mktpower		-0.43		-0.13
		[0.07]*		[0.22]
Bi*AP_d		0.75		
		[0.02]**		
Bi*AP_per				0.01
				[0.00]***
Constant	-2.77	-2.78	-.1.10	-2.02
	[0.00]***	[0.00]***	[0.00]***	[0.00]***
Observations	1,547	1,080	1,529	1,072
Pseudo 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)
	AP_gap					
	= – 1			**= + 1**		
L_Age	-0.05	-0.22	-0.23	-0.41	-0.62	-0.45
	[0.82]	[0.41]	[0.29]	[0.03]**	[0.02]**	[0.02]**
L_emp	0.14	0.22	0.11	0.13	0.24	0.13
	[0.19]	[0.10]	[0.31]	[0.17]	[0.06]*	[0.16]
D_Foreign	0.29	-0.23	0.41	-0.23	0.05	-0.39
	[0.50]	[0.68]	[0.37]	[0.58]	[0.93]	[0.37]
D_State	-0.13	-0.52	0.02	-0.39	-1.11	-0.34
	[0.73]	[0.27]	[0.97]	[0.27]	[0.02]**	[0.34]
D_Export	0.19	0.27	0.06	-0.60	-1.59	-0.72
	[0.70]	[0.65]	[0.91]	[0.20]	[0.01]***	[0.13]
D1_AR_gap	-0.23	-0.12	-0.23	0.56	0.99	0.41
	[0.55]	[0.81]	[0.55]	[0.06]*	[0.01]**	[0.18]
D2_AR_gap	-0.89	-1.28	-1.40	-0.48	-0.50	-0.62
	[0.03]**	[0.02]**	[0.00]***	[0.17]	[0.29]	[0.08]*
LC_unused	0.25			-0.41		
	[0.67]			[0.45]		
D_RE		-0.38			-0.56	
		[0.31]			[0.12]	
AP_discount			0.40			0.89
			[0.46]			[0.04]**
Constant	-22.32	-0.43	-0.87	0.30	0.94	-0.91
	[0.00]***	[0.80]	[0.55]	[0.79]	[0.58]	[0.56]
Observations	583	374	569	583	374	569
Pseudo R-squared	0.23	0.28	0.23	0.23	0.28	0.23

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

The reported estimates are from logit (Colums 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)
	AR_d	*AR_d*	*AR_d*	*AR_per*	*AR_per*	*AR_per*
L_Age	-0.13	-0.11	-0.14	-0.14	-0.14	-0.14
	[0.14]	[0.18]	[0.13]	[0.01]**	[0.01]**	[0.01]**
L_emp	0.04	0.05	0.07	0.07	0.06	0.08
	[0.35]	[0.28]	[0.12]	[0.02]**	[0.02]**	[0.01]***
D_Foreign	0.43	0.39	0.34	0.03	0.00	0.02
	[0.05]**	[0.07]*	[0.13]	[0.80]	[0.99]	[0.90]
D_State	0.01	0.01	0.00	0.052	0.05	0.07
	[0.97]	[0.96]	[1.00]	[0.59]	[0.57]	[0.50]
D_Export	-0.35	-0.31	-0.31	-0.01	0.01	0.01
	[0.09]*	[012]	[0.14]	[0.93]	[0.94]	[0.96]
AP_d	1.42	1.41	1.29			
	[0.00]**	[0.00]***	[0.00]***			
AP_per				0.02	0.02	0.01
				[0.00]***	[0.00]***	[0.00]***
LC_unused	0.28	0.20	0.28	0.10	0.07	0.10
	[0.30]	[0.45]	[0.31]	[0.56]	[0.69]	[0.57]
Uniqueness	0.00			0.00		
	[0.68]			[0.62]		
Contracts		0.43			0.22	
		[0.02]***			[0.05]*	
Property_rights			-0.00			0.00
			[0.57]			[0.88]
Constant	-2.49	-3.28	-2.89	-1.39	-2.03	-1.44
	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***
Observations	1,766	1,865	1655	1,756	1,857	1640
Pseudo R-squared	0.13	0.13	0.12	0.14	0.14	0.14

Table 12: Summary Statistic on The Implicit Cost of Trade Credit

The table presents summary statistics for the implicit rate of trade credit (*AR_cost*), the bank interest rate (*Bank_cost*), the sum of bank interest rate and annual fee (*Bank_cost_fee*) and the difference between the rate of trade credit and the two bank interest rates, namely (*Diff_AR_Bank*) and (*Diff_AR_Bank_fee*). The numbers are percentages.

	Obs	Mean	Std. Dev.	5% of the sample	10% of the sample	25% of the sample	50% of the sample	75%of the sample	Min	Max
AR_cost	133	167.74	540.65	2.03	3.68	10.16	27.43	64.91	1.2	3,600
Bank_cost	81	6.3	7.79	0.6	4.00	5.00	5.8	6.31	0.01	74
Bank_cost_fee	53	10.9	15.30	2.76	5.24	5.85	7	9	1.6	104
Diff_AR_Bank	81	215.19	668.98	-4.45	-0.19	6.10	23.43	78.06	-5.36	3,624
Diff_AR_Bank_fee	53	139.84	528.40	-12.45	-4.98	0.45	21.42	57.91	-30.18	3,619