Trade credit and the supply chain

Fabbri, D.; Klapper, L.F.

Trade Credit and the Supply Chain

Daniela Fabbri
Amsterdam Business School
University of Amsterdam
Amsterdam, The Netherlands
31-20-525-4344
d.fabbri@uva.nl

Leora F. Klapper*
The World Bank
Development Research Group
Washington, DC 20433
1-202-473-8738
lklapper@worldbank.org

July 2009

Abstract: This paper studies supply chain financing. We investigate why a firm extends trade credit to its customers and how this decision relates to its own financing. 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). Similarly, firms lacking internal resources and without access to bank credit, and firms that use more costly informal sources of financing, are more dependent on the receipt of supplier financing in order to extend credit to their customers.

---

* Corresponding author. We thank Mariassunta Giannetti, Vicente Cunat, Arturo Bris, Luc Laeven, Inessa Love, Max Macsimovic, Robert Marquez, Rohan Williamson, Chris Woodruff, and participants at the 2009 Financial Intermediation Research Society (FIRS) Conference on Banking, Corporate Finance and Intermediation in Prague, the "Small Business Finance–What Works, What Doesn't?" Conference in Washington, DC, the Second Joint CAF-FIC-SIFR Conference on Emerging Market Finance in Stockholm, and the 4th Csef-Igier Symposium on Economics and Institutions in Capri for valuable comments, and Taras Chemsky for excellent research assistance. The opinions expressed do not necessarily represent the views of the World Bank, its Executive Directors, or the countries they represent.

"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

Supply chain financing (inter-firm financing) is an important source of funds for both small and large firms around the world (Petersen and Rajan, 1997, Demirguc-Kunt and Maksimovic, 2002). An interesting characteristic of supply chain financing is that many firms use trade credit both to finance their input purchases (accounts payable) and to offer financing to their customers (accounts receivable). This pattern is widespread among both large public companies and small credit-constrained firms (McMillan and Woodruff, 1999; Marotta, 2005; van Horen, 2005).

These earlier results raise several questions related to capital structure decisions of the firm: For instance, why do listed firms with access to both private and public financial markets make large use of trade credit, if trade credit is presumed to be more expensive than bank finance? Alternatively, why do small credit-constrained firms decide to offer trade credit to their customers and how do they finance this extension of credit?

To address these questions, we explore the importance of profitability, bank financing, and access to supplier financing. In particular, we explore how the decision to offer trade credit to customers relates to the decision to take trade credit from suppliers. We also examine the effect of the competitive landscape and a firm's market power – relative to both its suppliers and buyers – in the firm's decision to extend and use trade credit. To preview our main result, we find strong evidence that credit constrained firms are likely to match the use and terms of trade credit across their up-stream and down-stream supply chain. This relationship is strongest for firms with weaker bargaining

power vis-à-vis their buyers – and stronger bargaining power, relative to their suppliers. This is a novel finding that suggests a symbiotic relationship between a firm and its customers and suppliers.

Related literature has focused on one-side of the trade credit relationship in isolation and has therefore been unable to provide evidence to address these questions. We take a new step in this direction, by looking at trade credit along the supply chain, i.e. we consider simultaneously both sides of firm business – the relation between a firm, its customer (product market) and its suppliers (input market). This unique perspective is crucial to highlight a novel link between the supply and the demand of trade credit.

We use a large firm-level survey of Chinese firms, which is a unique source of data for at least two reasons. 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, 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). Moreover, since only about 30% of firms in our sample have a line of credit, our analysis identifies the unique role of trade credit for credit constrained firms in an emerging market.

Our empirical analysis provides a number of intriguing results. First, we document the importance of trade credit as a competitive gesture. Specifically, firms that face stronger competition in the product market are also more likely to extend trade credit and have a larger share of goods sold on credit.

Next, we investigate how these firms finance the provision of trade credit and we provide empirical support for a matching story. In a novel finding, we 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. Specifically, 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. Furthermore, 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, and vice versa.

Finally, we investigate in which circumstances firms are more likely to adopt a matching strategy. We identify two distinct patterns: First, this matching practice seems to be affected by the availability of internal and external funds. Firms with positive retained earnings and bank credit 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. Second, this matching practice changes along the supply chain, i.e. it is more likely among firms that face stronger competition in the output market (firms that may need to offer trade credit as a competitive gesture) and enjoy stronger market power in the input market (firms that can demand favorable credit terms).

Our paper contributes to the literature on trade credit along several dimensions. First, it is related to the literature investigating the effect of market structure on trade credit.

Wilner's (2000) argument is that a *customer* – particularly in financial distress – obtains more trade credit if he generates a large percentage of the supplier's profits (i.e. the supplier's bargaining power is low). Cunat 's (2006) paper shows that suppliers have extra enforceability power coming from the existence of a link that makes both suppliers and customers costly to substitute. This link takes the form of intermediate goods being specific to the buyer. It follows that trade credit should be higher when intermediate goods are very specific, in general, when suppliers are costly to substitute (i.e. the supplier's bargaining power is high).[1]

Our data allows us to empirically test the theoretical findings that trade credit relationships depend on the strength of customer/supplier relationships by examining the relative market power of the firm relative to both its customers its suppliers. Our results complement the existing evidence on the relation between competition and trade credit. The empirical literature finds contrasting evidence on this issue and mainly focuses on competition in *product* markets and its effect on the decision to extend trade credit (see among others McMillan and Woodruff, 1999; Fisman and Raturi, 2004, and Giannetti, Burkart and Ellingsen, 2009). One key advantage of our paper is the detailed information about both the firm's market environment and credit contract terms. This rich information allows us to relate several proxies for competition not only to the decision to offer trade credit, but also to the specific credit terms offered to customers. Furthermore, as a second key result, we document the relevance of market structure in the *input* market to supply chain finance decisions.

[1] Some of our measures of bargaining power, like the number of suppliers that a customer uses, is a proxy for the cost to substitute the supplier.

Second, our matching story links our paper to the literature on working capital and risk management. The positive correlation between the decision to offer receivables and the decision to use payables is consistent with the recent focus of analysts on cash holdings, which may offer incentive to mangers to extend payment terms in order to maintain higher cash balances in working capital management (Bates, Kahle and Stulz, 2008).[2] At the same time, our evidence of a matching maturity strategy between the contract terms of payables and receivables supports the theoretical literature (Diamond, 1991 and Hart and Moore, 1991) and the empirical evidence (Guedes and Opler, 1996; Stohs and Mauer 1996; Demirguc-Kunt and Maksimovic 1999) on firm's matching maturity of assets and liabilities. We bring forward the idea that firms with no or limited access to internal resources and formal external financing match the maturity of assets and liabilities by using account payables as a risk management tool, i.e. to hedge their short-term receivables risk.

Some suggestive evidence of a relationship between payables and receivables has been documented in other papers, but the lack of data on trade credit contracts simultaneously received and extended precluded a compelling analysis. Petersen and Rajan (1997) show that U.S. firms whose assets consist mainly of current assets (they do not use receivables) demand significantly more trade credit. Johnson, McMillan and Woodruff (2002) and Boissay and Gropp (2007) document that firms *involuntary* pass the delay of payments from customers to their suppliers.[3]

[2] Furthermore, changes in inventory practices have led to firms holding more inventory (short-term assets), which would increase the demand for payables (short-term liabilities).

[3] Johnson, McMillan and Woodruff (2002) find that in European transition economies firms with a larger proportion of invoices paid by customers after delivery tend also to pay their suppliers late. Similarly, Boissay and Gropp (2007) document that French firms with late paying customers are more likely to default on their suppliers.

In contrast, we document that firms use payables to hedge their short-term receivables risk in a *voluntary* and *consistent* way. In particular, firms offer to their customers credit amounts and terms (discount and number of days) that are similar to the ones they have been offered from their suppliers. Moreover, firms having customers paying early are more likely to remit early to their suppliers, suggesting again, that firms do not simply try to increase as much as possible the amount of payables, but they time the payment structure in the down-stream and up-stream market.

Bridging the literature on trade credit with risk management allows us to rationalize two stylized facts for which the extant literature still lacks a clear understanding. First, most of the extant literature has stressed the importance of credit constraints as a reason to take trade credit (i.e. Biais and Gollier, 1997 and Burkart and Ellingsen 2004). However, this motivation does not explain the large use of trade credit by large and public companies with access to both public and private financial markets (i.e. Demirguc-Kunt and Maksimovic 2002), as well as the evidence that small and credit constrained firms are more likely to both grant and receive trade credit than large unconstrained firms (McMillan and Woodruff, 1999 and Marotta 2005).[4] Our argument is that the matching story can provide an explanation for these two stylized facts. More specifically, small and credit-constrained firms are able to offer trade credit to their customers (needed to compete in the product market) as long as they receive payables from their own suppliers. While large and unconstrained firms might decide to take trade credit to hedge receivables risk.

[4] 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). These are authors' estimations.

Finally, our paper is also related to the more recent literature analyzing the role of trade credit in developing economies (McMillan and Woodruff, 1999; Johnson McMillan and Woodruff, 2004; Allen, Qian, and Qian, 2005 and Cull, Xu and Zhu, 2007). The general idea in this literature is that trade credit can represent a viable substitute for formal bank credit and therefore a crucial determinant of firm growth for a country at the earlier stages of its development or during the transition towards a market based economy. Cull, Xu and Zhu (2007) test whether Chinese firms have indeed used trade credit substitute for the lack of formal institutions to stimulate growth, but they do not find supporting evidence.[5] Instead they argue that the Chinese growth is fueled by a growing private sector with increasing competitive pressure. Competition is then likely to be an important motivation for the use of trade credit in line with our results. Given that widespread competitive pressures across sectors is a common feature of developed and market-based economies, our findings are not specific to China but have more general implications. A similar conclusion also holds for our matching story in general, as well as for the finding that the credit constrained firms in our sample are more likely to match contract terms of payables and receivables, given that relatively illiquid firms with limited access to bank loans are also widespread in developed economies, mainly among small and medium-sized enterprises (see Berkovitz and White, 2004 and Fabbri and Klapper 2008 for evidence on credit constraints among U.S. firms).[6]

[5] They focus on differences in ownership structures, since in China it is not so much the lack of a formal financial system but rather its institutional bias in favor of state-owned enterprises that could give rise to trade credit among viable firms with restricted or no access to credit from state-owned banks.

[6] Berkovitz and White (2004) find that the probability of a firm being credit constrained is 29% for noncorporate U.S firms and 26% for U.S. corporations. Fabbri and Klapper (2008) document that less than half of SMEs in the U.S. have a line of credit.

The remainder of the paper is organized as follows. Section 2 provides the theoretical background and derives our testable hypotheses. Section 3 describes the data. Section 4 presents empirical results. Section 5 discusses our results and addresses some related issues. Section 6 concludes.

2. Hypotheses

This section presents a conceptual framework and economic intuition for our hypotheses.

First, consider a firm buying inputs from its suppliers and selling products to its customers. We argue that the amount of sales depends on the competitive structure of the output (down-stream).market. In particular, our "*Market Power*" hypothesis suggests that when competition in the down-stream market is high, profit margins are low and the survival of the firm can be threatened. By offering trade credit the firm attracts new customers, in particular ones with strong preferences for delayed input payments.

Yet, by offering receivables to customers, the firm postpones its receipt of cash payments – which can be financed using internal finance, such as retained profits, or external funds like bank financing. We provide an alternative hypothesis: the "*Supply Chain*" hypothesis, which proposes that firms finance their extension of accounts receivable with access to trade credit from their own suppliers (accounts payables). Trade credit can be an attractive source of funds for several reasons. First, trade credit is simple and convenient to use because it has low transaction costs. For example, in general no additional paperwork is required, as would be the case for a bank loan. Second, it is a flexible source of funds and can be used as needed. For instance, firms can

pre-pay outstanding payables to suppliers if its customers remit early. Finally, payables might be the only source of funds available to firms. This implies that firms that are credit-constrained by banks or lack internal liquidity should rely more on accounts payable to finance accounts receivable.

Once a firm has decided to use payables to finance its receivables, the firm must set specific credit terms. In principle, firms could try to extend the delay of payment of their inputs as far as possible. However this strategy can be expensive for the firm if a large discount for early payments has been offered or it can endanger the firm's supply chain if this request puts the supplier in financial distress. In both cases, the firm might have incentives to negotiate credit terms just long enough to finance their own credit extension, or equal to the maturity of their receivables. This would also allow the firm to eliminate the financial risk due to future changes in the interest rate. This strategy implies that accounts payable can be used to optimally hedge receivables risk. We empirically test this "*Matching Maturity*" hypothesis, which supposes that firms aim to match the maturity of their assets and liabilities in trade credit decisions.

Finally, we incorporate the role of market structure in the input market (up-stream market) on the firm's ability to receive its preferred amounts and terms of trade credit from its suppliers. Consistent with the role of competition in the down-stream market, we assume that the firm is more likely to get the desired extension in input payments if its supplier sells in a competitive market and it therefore willing to extend favorable terms to retain the firm as a customer.

To summarize, we derive the following testable predictions:

(i) The "Market Power" hypothesis. Trade credit is offered by firms to survive in highly competitive product markets. Thus, we test whether the firm decision to extend trade credit to customers and the amount of trade credit offered depend on the product market structure:

Account Receivable (AR) indicators =
f {Firm characteristics, Market Power indicators} *{1}*

(ii) The "Supply Chain/ Matching Maturity" hypothesis. Firms need to finance their provision of trade credit. They can use internal resources, like retained earnings, or alternatively bank credit, if they have access to external finance. According to previous literature (Frank and Maksimovic 2005, Giannetti, Burkart and Ellingsen, 2009), firms that are bank credit constrained should extend less trade credit. As an extension of this argument, credit constrained firms should extend shorter terms, as well as firms dependent on more costly financing, such as family and informal loans. We also test an alternative hypothesis – that firms finance their extension of trade credit (accounts receivables) with trade credit from their own suppliers (accounts payables). An extension of this argument is that firms aim to match the maturity of their trade credit assets and liabilities. We therefore estimate the following model:

AR indicators =
f {Firm characteristics, Financial characteristics, AP indicators} *{2}*

An alternative way to test our matching maturity story is to look at actual trade credit terms used, rather than the terms offered. 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, Financial characteristics, AR indicators) *(3)*

(iii) Interactive effects:

(iii.a) Financial Constraints: The availability of internal or external sources of funds is likely to affect the need to rely on the matching strategy. We include the interaction between access to various sources of internal and external financing and accounts payable to test whether credit constrained firms or firms with less access to internal or external financing depend more on matching the terms of payables and receivables:

AR indicators =
f {Firm characteristics, Financial Characteristics, AP indicators,
Interaction of Financial and AP indicators} *{4}*

(iii.b) Market power: The ability to receive the desired amount and maturity of payables to match the terms of receivables reflects a *strong* position in the firm/supplier bargaining relationship, which depends on the competitive structure *of* the *up-stream* market. We therefore include the interaction terms of market structure and accounts payable to test whether firms operating in more competitive markets are more likely to match payables and receivables:

AR indicators =
f {Firm characteristics, Market Power indicators, AP indicators,
Interaction of Market Power and AP indicators} *{5}*

3. 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.[7] The dataset includes a large, randomly selected sample of firms across 12 two-digit 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. One limitation of the database is that only limited accounting (balance sheet) data is surveyed, and this data is missing for most firms, which might be explained by the large number of small, unaudited firms in the sample.[8] In addition, in many countries (including China) the survey excludes firms with less than four years of age, in order to complete questions on firm performance and behavior relative to three-years earlier.

We use the 2003 *World Bank Enterprise Survey* for China, which is the only country survey to include detailed questions on supply chain terms, as well as additional questions on the market environment, such as the number and importance of supplier and customer relationships. 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. This allows us to precisely identify the decision of firms to offer trade credit. From

[7] The survey instrument and data are available at: www.enterprisesurveys.org.
[8] For example, the survey asks for the amount in yuan of sales and accounts payable, but does not collecte information on accounts receivables. Balance-sheet financial data is available for about 60% of sampled firms. For additional information on the surveys, see Ayyagari, et al. (2008a) and Ayyagari, et al. (2008b).

our sample of 2,400 firms, 2,295 firms report whether or not they extend trade credit to their customers.[9]

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.

3.1 Trade credit 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 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 about 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*).

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.

[9] We also exclude from our sample 157 firms that provide financial services.

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. Our dataset also allows us to examine the payment performance of firms' customers (i.e. the collection of accounts receivable). We include the percent of total sales received by the firm due to the overdue penalty (*AR_overdue*). We find that customers pay firms in our sample an average fee of 19% (and a median of 10%) of total sales.

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.[10] Similar to accounts receivable, the median term of payables is approximately one month (*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, firms that extend trade credit to their customers are offered, on average, 46 days before its own suppliers imposes penalties, while firms that *do not* extend credit receive shorter offers (only 29 days); this difference is significant at 1%.

We also include the percent of total input costs paid to suppliers due to overdue penalties (*AP_overdue*); firms pay, on average, overdue fines equal to 1.67% of input

[10] For the sample of firms with available balance sheet information, we confirm that firms using supplier financing report positive accounts payable and visa versa. We corrected *AP_d* in one case where the firm reported not purchasing inputs on credit but it had a positive value for accounts payable.

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 greater 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.

3.1.1 Sample comparisons

We perform a number of robustness tests to verify that our sample – and results – is representative of both China and other emerging markets. First, we compare our sample to Cull et al. (2008), who use a large panel datasets of over 100,000 industrial Chinese firms and find that the average percentage of sales financed by accounts receivable in their sample of domestic private firms in 2003 is 18% (their dataset does not include additional contract information or information on accounts payables). This compares to 22% in our sample of firms (AR_per), which further suggests that our random sample of Chinese firms is nationally representative.

We also find that the use of trade credit in China is comparable to other countries. For example, using the complete World Bank Enterprise Survey database of over 100 developed and developing 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 45% in China, and 51% for the complete sample. In addition, 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 44% for the complete sample.

However, the use of trade credit in the U.S. is about two times the use in China. According to the Federal Reserve Survey of Small Business Financing (SSBF) database of U.S. firms, about 65% of firms use trade credit to finance supplier purchases (20% more than in our sample of Chinese firms). In addition, the percentage of purchases made using trade credit is 20% among U.S. SMEs that use trade credit from suppliers (versus 10% in our sample of Chinese firms) and only 20% of firms that use trade credit are offered an early payment discount from their suppliers (in comparison to 7% in our sample of Chinese firms).[11] It is interesting to note that even in the U.S., about 80% of trade credit contracts do not include a pre-payment discount – which suggests that trade credit might in fact be a relatively cheap source of financing across both developed and developing countries.

We believe that our results shed light on trade credit behavior more broadly than the Chinese market. Uunique features of the Chinese economy – such as the bias towards state-owned banks and state-owned firms – have been decreasing since 2001 (two years before our survey takes place) and we carefully address related potential biases. Moreover, there are no country-specific regulations on inter-firm financing. Finally, 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.[12]

[11] All U.S. data is cited from Giannetti, Burkart, and Ellingsen, 2009.

[12] 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.

3.2 Firm characteristics

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*). 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.Likewise, 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 because of the large number of missing observations and unaudited firms in our sample. 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 (*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% (*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 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 (*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.

3.3 Competition structure of the input and output markets

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 (*No_supl_cust_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 (*Compet_mktshare_1%*). This value proxies for market competitiveness; a value of one connotes weaker market power, relative to the firm's competitors (and buyers).

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*). Moreover, we proxy for broader changes in the competitive landscape 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 in response to greater competitive pressures in the market (*Lowered_prices*). 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 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 *Sales_largest_cust_5%*, which is a measure of the market power of a firm relative to its *customers*.

In our sample, 751 of 1,762 firms (43%) have weak bargaining power relative to their customers (*Sales_largest_cust_5%* equals one), and 637 of 1,514 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 1,205: 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 (*Sales_largest_cust_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.

3.4 Financial variables

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 (*Bank*) and family or informal credit (*Fam/Informal*). Finally, since we do not have balance sheet information on cash holdings, 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 (*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.

3.5 Institutional and other variables

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.[13] This variable is defined at the firm-level and therefore reflects how the firm *perceives* the quality of legal

[13] 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. For example, Giannetti, Burkart and Ellingsen. (2009) make the point that input characteristics affect borrower's opportunism. As a consequence the use of trade credit is higher when goods sold have lower liquidity or resale value, as for customized goods. Cunat (2006) argues that trade credit use is explained by the presence of closer customer-supplier relationships; that is when the intermediate goods are customized. Our survey allows us to control for these product characteristics. More specifically, we know the percentage of sales made to client's unique specification (*Uniqueness*), which is about 40% of goods, on average. This characteristic could also measure the collateral value of the good since a higher percentage of sales made to clients' unique specification makes more difficult to resell the good to other clients in case of firm's default.

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. If this is the case, one could claim that our evidence on a matching story could be explained by firms in the supply chain belonging to the same industry. In all regressions, we control for this endogeneity problem by including 12 "industry" dummies that correspond to 2-digit NACE codes, which is the finest level of sector classification available.[14] 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

[14] Similarly, Burkart, et al. (2009) use 2-digit industry classifications to identify product specificity.

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.[15] This exercise suggests that trade credit use and terms are not driven solely by product characteristics and further motivates our search for additional explanations.

4. Results

Regressions are shown in Tables 5 to 10. 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. Our finding that larger and younger firms offer more trade credit is not necessarily counterintuitive in a developing country context, where firms often remain small over time (and fail to grow as they age); for instance, the correlation between firm size and age in our sample is only 0.30 percent.[16] We find no consistent significant relationships, however, with foreign or state ownership or exports.

Table 5 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

[15] Additional industries available upon request.
[16] For additional discussion, see Klapper, et al. (2006), which shows that the relationship between age and size (measured by value added) is smaller in countries with weaker business environments.

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. A discrete change in product market competition (measured by *Sales_largest_cust_5%*) increases the likelihood to offer trade credit (*AR_dum*) by about 5 percentage points, which corresponds to 12.5% of the average likelihood. The same shock also increases the share of goods sold on credit (*AR_per*) by 68 percentage points. Both figures suggest that the economic effect of competition on trade credit supply is economically relevant. This would explain why even small firms without access to bank credit might still want to extend trade credit to their customers.[17]

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

[17] 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.

extend credit to its customers, after controlling for other potential sources of accounts receivable financing. Table 6, Panels A and B, document the relevance of each source of financing. As shown in Panel A, unused bank credit lines (*LC_unused*) does not appear to have an effect on the likelihood to offer trade credit, the percentage of sales financed by trade credit, the length of the payment period, or the offer of a pre-payment discount.[18] We also include dummy variables indicating that the firm uses retained earnings, bank financing, and informal or family sources of financing and find consistently that even after including these variables, only accounts payable terms are significant. Our results are also robust to the inclusion of a dummy indicating positive profitability (not shown).[19]

The most intriguing result of Table 6 is the robust finding 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 terms 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 discrete change in the decision to take trade credit (*AP_dum*) increases the firm's likelihood to offer trade credit (*AR_dum*) by about 33 percentage points. A one standard deviation increment in the percentage of inputs purchased on credit (*AP_per*) increases the percentage of goods sold on credit by 87 percentage points. A discrete change in the likelihood to receive a pre-payment discount from suppliers (*AP_discount*) increases the firm's likelihood to offer a pre-payment

[18] 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).
[19] These results are also robust to the exclusion of accounts payable terms.

discount to customers (*AR_discount*) by about 22 percentage points. Finally, a one standard deviation increment in the number of days the firm is allowed to use trade credit (*AP_days*) increases by 3 days the payment period offered to customers (*AR_days*). This increment corresponds to the 8% of the average payment period offered. These figures suggest that changes in the contract terms received by suppliers have a significant economic impact on the contract terms offered by firms to their customers.

Although the decision to extend trade credit is not significantly dependent on access to external financing, we do find that firms that are credit-constrained or lack internal resources are significantly more likely to extend trade credit if they receive credit from their own suppliers. Table 7 shows our results. The interaction terms between the use of accounts payables (*AP_dum*) and *LC_unused* or our *Bank* dummy are not 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). 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 7 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 and significant terms: the coefficient on the interaction of accounts payable and retained earnings is significantly negative, while the interaction of accounts payable and informal financing is significantly positive. These results suggest that

whereas retained earnings might be used to finance the extension of trade credit as an alternative to account payables, 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. These patterns are consistent with trade credit that is more expensive than retained earnings but still cheaper than informal financing (Ayyagari, Demirguc-Kunt, and Maksimovic, 2003).

Table 8, 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_dum* 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.[20]

Table 9 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 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),

[20] 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.

respectively, and zero otherwise. We also control for external and internal resources through *LC_unused* and retained earnings (*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 10 tests a series of variables found to be significant indicators of trade credit supply in previous literature. In particular we focus on product characteristics (Giannetti, Burkart and Ellingsen, 2009 and Cunat, 2006). We find that after including accounts payable terms, selling customized goods (*Uniqueness*) does not effect the use or share of trade credit. Since accounts payable keep their significance, this result suggests that our matching story holds after controlling for product characteristics. We also control for whether contractual formalism affects the use of trade credit and we find that entering into written contracts with clients (*Contracts=1*) increases the likelihood to

offer trade credit. 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 (*Property_rights*) seems to have no significant impact on trade credit supply. This last result is 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. The findings in Table 10 are also robust to the inclusion of various measures of market power.

Finally, we perform a series of important 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% (*State=0*), or to non-exporter firms (*Export=0*). . 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).[21]

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

[21] Regression results available upon request.

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 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 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 to sell 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) and Klapper, Laeven, and Rajan (2008) document that a majority of the U.S. firms in their sample appear to 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.

A second important issue 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? Although we are constrained by the limitations of cross-sectional data, we take a first step in addressing this issue by estimating a simultaneous-equation-model where we let accounts receivable (*AR_dum* and *AR_per*) depend on accounts payable (*AP_dum* and *AP_Per*) and vice versa (after controlling for the usual firm characteristics, sector and city heterogeneity).[22] The results (Table 11) 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. 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.

Our result on the role of market competition raises another question: if competition is a main driver behind the decision to offer trade credit, why do firms not simply reduce the product price instead of offering a trade credit discount? 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.

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

Alternatively, if firms are able 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 more 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 financing for small and medium sized enterprises– 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. Finally, we find that for over 20% of firms in our sample trade credit is indeed cheaper than bank financing, which may explain why firms without credit constraints choose to use trade financing. These results highlight the importance of supply chain financing for market competition and growth.

References:

Ayyagari, Meghana, Asli Demirguc-Kunt, and Voijslav Maksimovic, 2008a. Firm innovation in emerging markets: The roles of governance and finance. *Journal of Financial Economics*, forthcoming.

Ayyagari, Meghana, Asli Demirguc-Kunt, and Voijslav Maksimovic, 2008b. Formal versus informal finance : evidence from China. *Journal of Financial Economics*, forthcoming.

Allen, Franklin, Jun Qian, and Meijaun Quian, 2005. Law, Finance and Economic Growth in China. *Journal of Financial Economics* 77, 57-116.

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

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

Berkowitz Jeremy and Michelle J. White, 2004. Bankruptcy and Small Firms' Access to Credit. *Rand Journal of Economics* 35, 69-84.

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

Boissay, Frederic 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, 2009. What You Sell is What You Lend? Explaining Trade Credit Contracts. *The Review of Financial Studies*, Forthcoming.

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. *Journal of Financial Intermediation,* forthcoming.

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

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

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, 2002. Firms as Financial Intermediaries: Evidence from Trade Credit Data, World Bank Working Paper.

Diamond D., 1991. Debt Maturity Structure and Liquidity Risk. *Quarterly Journal of Economics*, 56. 709-738.

Fabbri Daniela and Leora Klapper, 2008. The Choice to Collateralize. Working Paper.

Fabbri, Daniela and Annamaria Menichini, 2007. Trade Credit, Collateral Liquidation and Borrowing Constraints. *Journal of Financial Economics*, Forthcoming.

Ferris, J. Stephen, 1981. A Transaction Theory of Trade Credit Use. *The 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.

Giannetti, Mariassunta, Burkart, Mike and Tore Ellingsen, 2006. What You Sell is What You Lend? Explaining Trade Credit Contracts. *Review of Financial Studies*, forthcoming

Guedes, Jose and Tim Opler, 1996. The determinants of the Maturity of Corporate Debt Issues. *The Journal of Finance* 51, 1809-1833

Hart, Oliver and John Moore, 1991. A Theory of Debt Based on the Inalienability of Human Capital. *The Quarterly Journal of Economics* 109, 841-879.

Johnson, Simon, John McMillan and Christopher Woodruff, 2002. Courts and Relational Contracts. *Journal of Law, Economics and Organization*18, 221-277.

Klapper, Leora, Luc Laeven, and Raghu Rajan, 2008. Trade Credit Contracting. Mimeo.

Lee, Yul W. and John D. Stowe (1993), "Product Risk, Asymmetric Information, and Trade Credit," *Journal of Financial and Quantitative Analysis* 28, 285–300.

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.

Love, Inessa, Lorenzo A. Preve and Virginia Sartia-Allende, 2006. Trade Credit and Bank Credit: Evidence from Recent Financial Crisis. World Bank Working paper.

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.

Petersen, Mitchell A. and Raghuram G. Rajan, 1997. Trade Credit: Theory and Evidence. *Review of Financial Studies,* 10 (3), 661-691.

Smith, J. K., 1987. Trade Credit and Informational Asymmetry. *Journal of Finance*, 42, 863–872.

Stohs, M., and Mauer, D., 1996. The Determinants of Corporate Debt Maturity Structure. *Journal of Business*, 69, 279-312.

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., 2005. Do firms use trade credit as a competitiveness tool? Evidence from Developing Countries, World Bank Working Paper.

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

Table 1: Variable Definitions and Mean Statistics

Variable Name	Definition	Mean
	Measures of Trade Credit	
AR_dum	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	Average number of days customers are allowed to use the credit before the firm imposes penalties	60.15
AR_discount	Dummy (0/1), =1 if the firm offers a pre-payment discount on credit to its customers, =0 otherwise (and = . if AR_dum 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_dum	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	Average number of days the firm is allowed to use the credit before its suppliers imposes penalties	31.67
AP_discount	Dummy (0/1), =1 if the firm received a pre-payment discount on credit from its suppliers, =0 otherwise (and = . if AP_dum 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 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
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
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
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)		
Sales_largest_cust_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
Compet_mktshare_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
No_supl_cust_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 *Sales_largest_cust_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
Bank	Dummy (0/1), = 1 if the firm uses local or foreign bank financing for working capital or investment	0.49
RE	Dummy (0/1), = 1 if the firm uses retained earnings for working capital or investment	0.36
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
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_dum	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	60.15	47.41	1	180
AR_discount	823	0.20	0.40	0.00	1.00
AR_gap	809	0.08	0.79	-1.00	1.00
AP_dum	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	31.67	25.77	1	90
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
Foreign	2,242	0.07	0.26	0.00	1.00
State	2,242	0.23	0.42	0.00	1.00
Export	2,265	0.09	0.28	0.00	1.00
Sales_largest_cust_5%	1,762	0.57	0.49	0.00	1.00
Compet_mktshare_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
No_supl_cust_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
Bank	1,549	0.49	0.50	0.00	1.00
RE	1,457	0.36	0.48	0.00	1.00
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_dum=0**	**AR_dum=1**	**Sig.**
AP_dum	0.34	0.62	***
AP_per	4.44	17.51	***
AP_days	28.98	46.05	***
AP_discount	0.05	0.09	**
AP_gap	0.07	0.12	
L_Age	2.60	2.51	***
L_Emp	4.84	5.11	***
Foreign	0.06	0.10	***
State	0.24	0.19	***
Export	0.09	0.11	*
Sales_largest_cust_5%	0.54	0.64	***
Bi_mktpower	0.26	0.33	***
Compet_mktshare_1%	0.23	0.36	***
New_product	0.36	0.51	***
Lower_price	0.41	0.60	***
No_supl_cust_5	0.42	0.56	***
LC_unused	0.06	0.09	***
Bank	0.49	0.52	
RE	0.33	0.42	***
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_dum(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									
Foreign (7)	0.05*	0.12**	0.03	0.01	-0.11**	0.09**	1.00								
State (8)	-0.12**	-0.08**	-0.04	0.01	0.40**	0.21**	-0.15**	1.00							
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			
Compet_mktshare_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_dum	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: The Relationship between Trade Credit Supply and Market Power and Competition

The reported estimates are from logit (Colums 1-5) and OLS (Columns 6-10) regressions. AR_dum is a dummy indicating the use of accounts receivable. AR_per is the percent of monthly sales sold on credit. We transform AR_per in a continuous variable by using the inverse function of the logistic model. 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_dum	AR_dum	AR_dum	AR_dum	AR_dum	AR_per	AR_per	AR_per	AR_per	AR_per
L_Age	-0.24	-0.19	-0.14	-0.17	-0.24	-0.85	-0.67	-0.67	-0.6476	-0.5279
	[0.01]***	[0.02]**	[0.00]***	[0.03]**	[0.01]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.06]*
L_emp	0.16	0.10	0.10	0.09	0.16	0.51	0.36	0.41	0.3216	0.3123
	[0.00]***	[0.01]**	[0.00]***	[0.02]**	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.03]**
Foreign	0.55	0.34	0.14	0.34	0.55	1.49	0.78	1.08	0.8942	0.7311
	[0.03]**	[0.10]*	[0.24]	[0.09]*	[0.03]**	[0.08]*	[0.27]	[0.13]	[0.21]	[0.37]
State	-0.11	-0.10	-0.02	-0.12	-0.11	0.01	0.01	0.01	-0.1076	0.0142
	[0.48]	[0.49]	[0.78]	[0.39]	[0.48]	[0.98]	[0.98]	[0.99]	[0.77]	[0.98]
Export	0.33	0.35	0.39	0.34	-0.329	0.04	0.06	0.07	0.1368	0.1318
	[0.16]	[0.07]*	[0.04]**	[0.08]*	[0.16]	[0.96]	[0.93]	[0.91]	[0.84]	[0.86]
Sales_largest_cust_5%	0.21					0.77				
	[0.08]*					[0.02]**				
Compet_mktshare_1%		0.21					0.86			
		[0.07]*					[0.02]**			
Lower_price			0.56					1.55		
			[0.00]***					[0.00]***		
New_product				0.32					0.95	
				[0.00]***					[0.00]***	
No_supl_cust_5					0.21					0.51
					[0.08]*					[0.15]
Constant	-2.94	-1.92	-2.13	-1.92	-2.94	-11.94	-11.37	-11.89	-10.99	-12.27
	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***
Observations	1,611	1,974	2,011	2,016	1,611	1,623	2,000	2,038	2,040	1,524
Pseudo R-squared	0.09	0.08	0.09	0.08	0.07	0.13	0.12	0.12	0.12	0.11

Table 6 Panel A: The Relationship between Trade Credit Demand and Trade Credit Supply

The reported estimates are from logit in Columns (1), (3), (5), (7), OLS in Columns (2) and (6) and tobit regressions in Columns (4) and (8). AR_dum is a dummy indicating the use of accounts receivable. AR_per is the percent of monthly sales sold on credit We transform AR_per in a continuous variable by using the inverse function of the logistic model. AR_discount is a dummy indicating if the firm offers a pre-payment discount on credit to its customers; and AR_days is the average number of days customers are allowed to use the credit before the firm imposes penalties. 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 (Bank)*			
	AR_dum	*AR_per*	*AR_discount*	*AR_days*	*AR_dum*	*AR_per*	*AR_discount*	*AR_days*
L_Age	-0.13	-0.6859	-0.06	-2.09	-0.25	-0.67	0.14	-2.62
	[0.11]	[0.00]***	[0.76]	[0.50]	[0.01]**	[0.02]**	[0.54]	[0.47]
L_emp	0.06	0.2743	-0.03	0.56	0.08	0.28	-0.11	1.82
	[0.15]	[0.02]**	[0.76]	[0.73]	[0.11]	[0.05]**	[0.36]	[0.33]
Foreign	0.39	0.1974	0.03	-4.06	0.47	0.39	0.34	-3.69
	[0.07]*	[0.77]	[0.93]	[0.54]	[0.05]*	[0.66]	[0.44]	[0.61]
State	-0.03	0.1048	-0.15	-5.78	-0.00	0.033	-0.17	-14.09
	[0.85]	[0.78]	[0.63]	[0.28]	[0.98]	[0.94]	[0.69]	[0.03]**
Export	-0.33	0.2945	-0.87	9.87	-0.52	-0.42	-0.45	7.48
	[0.10]*	[0.64]	[0.06]*	[0.18]	[0.02]**	[0.56]	[0.34]	[0.35]
LC_unused	0.16	0.68	-0.13	5.80				
	[0.51]	[0.41]	[0.77]	[0.50]				
Bank					-0.08	-0.40	0.45	7.96
					[0.55]	[0.32]	[0.11]	[0.09]*
AP_dum	1.41				1.36			
	[0.00]***				[0.00]***			
AP_per		0.09				0.08		
		[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	-13.25	-19.37	64.48	-3.16	-13.18	-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	1,291	477	409
Pseudo R-squared	0.13	0.18	0.13	0.01	0.15	0.18	0.17	0.01

Table 6: Panel B: The Relationship between Trade Credit Demand and Trade Credit Supply

The reported estimates are from logit in Columns (1), (3), (5), (7), OLS in Columns (2) and (6) and tobit regressions in Columns (4) and (8) AR_dum is a dummy indicating the use of accounts receivable; AR_per is the percent of monthly sales sold on credit. We transform AR_per in a continuous variable by using the inverse function of the logistic model. AR_discount is a dummy indicating if the firm offers a pre-payment discount on credit to its customers; and AR_days the average number of days customers are allowed to use the credit before the firm imposes penalties. 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)
	Retained Earnings (RE)				*Family & Informal Financing (D_Fam_Inf)*			
	AR_dum	*AR_per*	*AR_discount*	*AR_days*	*AR_dum*	*AR_per*	*AR_discount*	*AR_days*
L_Age	-0.19	-0.56	0.18	-4.62	-0.22	-0.59	0.13	-2.02
	[0.08]*	[0.06]*	[0.49]	[0.22]	[0.04]**	[0.05]**	[0.61]	[0.59]
L_emp	0.06	0.20	-0.08	2.26	0.08	0.25	-0.07	2.46
	[0.27]	[0.16]	[0.54]	[0.22]	[0.16]	[0.08]*	[0.57]	[0.18]
Foreign	0.60	0.75	0.29	-8.56	0.51	0.27	0.36	-6.55
	[0.02]**	[0.42]	[0.52]	[0.23]	[0.06]*	[0.77]	[0.45]	[0.37]
State	0.02	0.40	-0.41	-15.03	-0.03	0.35	-0.51	-18.89
	[0.91]	[0.40]	[0.39]	[0.02]**	[0.86]	[0.47]	[0.29]	[0.00]***
Export	-0.40	-0.30	-0.42	5.67	-0.47	-0.30	-0.28	8.38
	[0.10]	[0.70]	[0.41]	[0.46]	[0.05]*	[0.70]	[0.58]	[0.29]
RE	0.14	0.24	0.29	-2.08				
	[0.32]	[0.57]	[0.31]	[0.65]				
Fam/Informal					-0.13	-0.05	-0.36	6.47
					[0.47]	[0.92]	[0.34]	[0.25]
AP_dum	1.50				1.44			
	[0.00]***				[0.00]***			
AP_per		0.09				0.09		
		[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	-13.59	-1.14	40.54	-2.90	-13.48	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	0.2	0.18	0.01	0.15	0.2	0.17	0.02

Table 7: The Financing of Trade Credit Supply:
Is Trade Credit Demand More Important for Credit Constrained Firms?

The reported estimates are from logit (Colums 1-4) and OLS (Columns 5-8) regressions. AR_dum is a dummy indicating the use of accounts receivable and AR_per is the percent of monthly sales sold on credit. We transform AR_per in a continuous variable by using the inverse function of the logistic model. 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_dum	*AR_dum*	*AR_dum*	*AR_dum*	*AR_per*	*AR_per*	*AR_per*	*AR_per*
L_age	-0.13	-0.25	-0.18	-0.22	-0.69	-0.66	-0.54	-0.59
	[0.11]	[0.01]**	[0.09]*	[0.04]**	[0.00]***	[0.02]**	[0.06]*	[0.05]*
L_emp	0.06	0.08	0.05	0.08	0.27	0.28	0.19	0.25
	[0.15]	[0.11]	[0.30]	[0.16]	[0.02]**	[0.05]**	[0.18]	[0.09]*
Foreign	0.39	0.49	0.61	0.51	0.21	0.45	0.78	0.36
	[0.07]*	[0.05]**	[0.02]**	[0.06]*	[0.76]	[0.59]	[0.40]	[0.70]
State	0.03	-0.02	0.01	-0.03	0.10	-0.03	0.37	0.32
	[0.85]	[0.93]	[0.94]	[0.86]	[0.79]	[0.95]	[0.43]	[0.52]
Export	-0.33	-0.53	-0.39	-0.47	0.29	-0.51	-0.31	-0.30
	[0.10]*	[0.02]**	[0.11]	[0.05]*	[0.65]	[0.47]	[0.69]	[0.70]
AP_dum	1.40	1.53	1.72	1.44				
	[0.00]***	[0.00]***	[0.00]***	[0.00]***				
AP_per					0.09	0.12	0.10	0.08
					[0.00]***	[0.00]***	[0.00]***	[0.00]***
LC_unused	0.11				0.84			
	[0.78]				[0.33]			
LC*AP_dum	0.10							
	[0.84]							
LC*AP_per					-0.01			
					[0.79]			
Bank		0.07				0.26		
		[0.68]				[0.53]		
Bank *AP_dum		-0.33						
		[0.20]						
Bank *AP_per						-0.06		
						[0.00]***		
RE			0.38				0.59	
			[0.04]**				[0.18]	
RE*AP_dum			-0.54					
			[0.05]**					
RE*AP_per							-0.03	
							[0.16]	
Fam/Informal				-0.11				-0.53
				[0.66]				[0.30]
Fam/Informal * AP_dum				-0.03				
				[0.93]				
Fam/Informal * AP_per								0.06
								[0.05]**
Constant	-2.97	-3.27	-3.44	-2.90	-13.2556	-13.5008	-13.606	-13.387
	[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	0.18	0.19	0.2	0.2

Table 8: 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 OLS (Columns 3-4) regressions. AR_dum is a dummy indicating the use of accounts receivable and AR_per is the percent of monthly sales sold on credit. We transform AR_per in a continuous variable by using the inverse function of the logistic model. 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_dum	*AR_dum*	*AR_per*	*AR_per*
L_Age	-0.23	-0.3	-0.86	-0.72
	[0.02]**	[0.01]***	[0.00]***	[0.00]***
L_emp	0.09	0.09	0.38	0.30
	[0.06]*	[0.14]*	[0.00]***	[0.01]***
Foreign	0.54	0.6	0.90	0.28
	[0.04]**	[0.03]**	[0.26]	[0.68]
State	-0.04	0.13	0.12	0.22
	[0.82]	[0.53]	[0.77]	[0.58]
Export	-0.23	-0.34	0.25	0.16
	[0.32]	[0.19]	[0.73]	[0.81]
AP_dum	1.22	1.34		
	[0.00]***	[0.00]***		
AP_per			0.06	0.08
			[0.00]***	[0.00]***
Sales_largest_cust_5%	0.03		0.15	
	[0.85]		[0.66]	
Sales*AP_dum	0.47			
	[0.05]*			
Sales*AP_per			0.03	
			[0.18]	
Bi_mktpower		-0.43		-0.26
		[0.07]*		[0.59]
Bi*AP_dum		0.75		
		[0.02]**		
Bi*AP_per				0.04
				[0.03]**
Constant	-2.77	-2.78	-11.58	-11.42
	[0.00]***	[0.00]***	[0.00]***	[0.00]***
Observations	1,547	1,080	1,529	1,803
Pseudo R-squared	0.16	0.15	0.19	0.19

Table 9: Ex-post Matching of Trade Credit Terms

The reported estimates are from multinomial logit regressions (AR_gap=0 is the base outcome). AR_gap is a dummy variable equal to 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); equal to 0 if the difference equals zero (i.e. the firm pays its suppliers on time); and equal to -1 if the difference is less than zero (i.e. the firms pays its suppliers late). 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]
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]
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]
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]		
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 10: Other Determinants of Trade Credit Supply: Collateral Value, Customer Creditworthiness and Legal Institutions

The reported estimates are from logit (Colums 1-3) and OLS (Columns 4-6) regressions. AR_dum is a dummy indicating the use of accounts receivable and AR_per is the percent of monthly sales sold on credit. We transform AR_per in a continuous variable by using the inverse function of the logistic model. See Table 1 for all 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_dum	*AR_dum*	AR_dum	*AR_per*	*AR_per*	*AR_per*
L_Age	-0.13	-0.11	-0.14	-0.67	-0.65	-0.67
	[0.14]	[0.18]	[0.13]	[0.01]***	[0.00]***	[0.01]***
L_emp	0.04	0.05	0.07	0.25	0.25	0.33
	[0.35]	[0.28]	[0.12]	[0.04]**	[0.03]**	[0.01]**
Foreign	0.43	0.39	0.34	0.34	0.20	0.39
	[0.05]**	[0.07]*	[0.13]	[0.63]	[0.77]	[0.60]
State	0.01	0.01	0.00	0.18	0.14	0.17
	[0.97]	[0.96]	[1.00]	[0.66]	[0.72]	[0.68]
Export	-0.35	-0.31	-0.31	0.28	0.35	0.20
	[0.09]*	[012]	[0.14]	[0.67]	[0.59]	[0.76]
AP_dum	1.42	1.41	1.29			
	[0.00]**	[0.00]***	[0.00]***			
AP_per				0.09	0.091	0.08
				[0.00]***	[0.00]***	[0.00]***
LC_unused	0.28	0.20	0.28	0.87	0.72	0.97
	[0.30]	[0.45]	[0.31]	[0.33]	[0.39]	[0.28]
Uniqueness	0.00			-0.00		
	[0.68]			[0.88]		
Contracts		0.43			0.53	
		[0.02]***			[0.23]	
Property_rights			-0.00			-0.00
			[0.57]			[0.83]
Constant	-2.49	-3.28	-2.89	-12.60	-12.07	-11.62
	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***	[0.00]***
Observations	1,766	1,865	1655	1,756	1,853	1,640
Pseudo R-squared	0.13	0.13	0.12	0.18	0.18	0.18

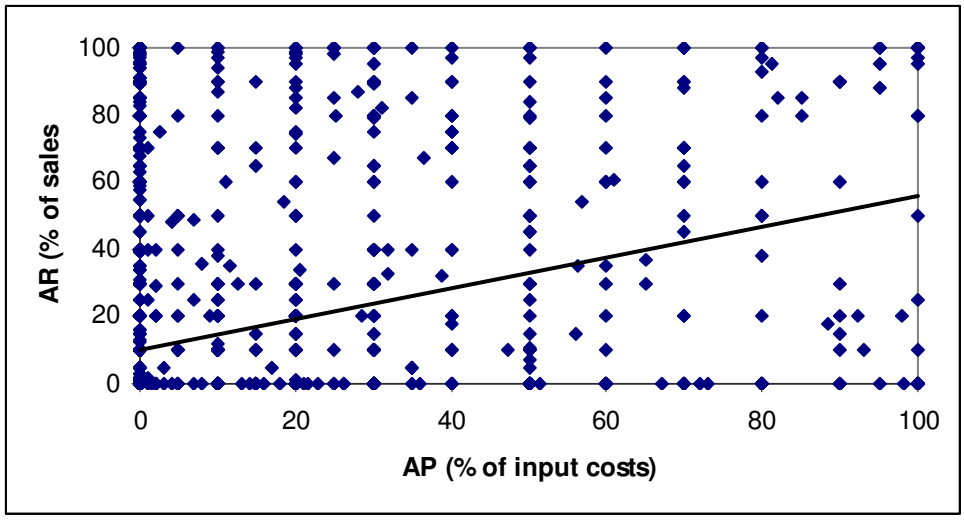
Table 11: Simultaneous Equation Model

The reported estimates are from a three-stages least squares regressions. Columns (1) and (2) refer to the simultaneous equation model for AR_dum and AP_dum, while columns (3) and (4) to the simultaneous equation model for AR_per and AP_per, See Table 1 for all 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_dum	*AP_dum*	*AR_per*	*AP_per*
L_Age	-0.02	-0.02	-1.79	0.03
	[0.40]	[0.24]	[0.08]*	[0.97]
L_emp	0.01	0.03	0.78	0.89
	[0.68]	[0.00]***	[0.22]	[0.05]**
Foreign	0.10	-0.05	1.341	3.85
	[0.03]**	[0.27]	[0.64]	[0.06]*
State	0.00	-0.04	-1.49	-1.61
	[0.95]	[0.13]	[0.41]	[0.24]
Export	-0.07	-0.03	3.84	-4.98
	[0.17]	[0.54]	[0.14]	[0.01]***
AP_dum	0.46			
	[0.33]			
AR_dum		0.34		
		[0.04]**		
AP_per			0.35	
			[0.14]	
AR_per				0.36
				[0.06]*
LC_unused		0.10		11.21
		[0.05]*		[0.00]***
Lowerprice	0.11		4.63	
	[0.00]***		[0.00]***	
N_supplier		-4.28e-06		-0.1e-03
		[0.80]		[0.95]
Constant	-2.49	-3.28	-2.89	-12.60
	[0.00]***	[0.00]***	[0.00]***	[0.00]***
Observations	1,783	1,873	1,773	1,773
R-squared	0.15	0.31	0.18	0.17

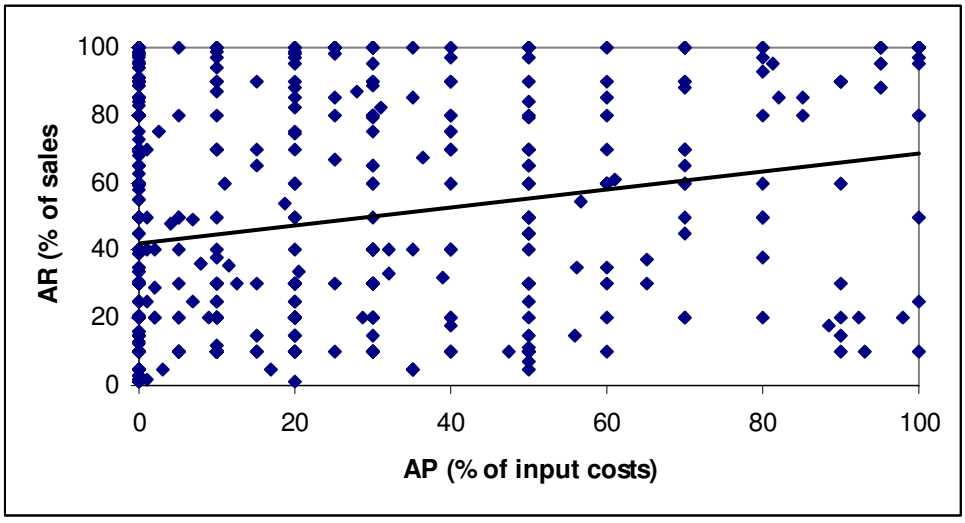
Figure 1: The percentage of inputs purchased on credit (from suppliers) Versus the percentage of sales sold on credit (to customers)

Panel A: Complete sample



β = 0.46; t-statistic = 16.8; obs. = 2,047

Panel B: If the firm uses accounts receivable



β = 0.27; t-statistic = 5.75; obs. = 625