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World Bank

June 2004

Online at http://mpra.ub.uni-muenchen.de/2792/
MPRA Paper No. 2792, posted 07. November 2007 / 02:44

Trade Credit as a Competitiveness Tool; Evidence from Developing Countries

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This Draft:
March 2005

Abstract

Statistics show that the sale of goods on credit is widespread among firms even when they are financially constrained and thus face relatively high costs in providing trade credit. A possible explanation for this is the use of trade credit as a competitiveness tool. By analyzing both the impact of customer as well as producer market power on a firm's decision to provide trade credit, we examine whether trade credit is indeed used as a way to lock in customers by firms in developing countries. Using a new dataset containing a large number of firms in 42 developing countries, we find strong evidence that an important driving force behind the decision to provide trade credit is the urge to be competitive. This especially holds for those firms that still have to establish a solid market reputation and for firms located in countries with an underdeveloped banking sector.

JEL Classification Codes: L10, L14

* Van Horen is with the University of Amsterdam and with the World Bank. I like to thank Stijn Claessens, Henk Jager, Franc Klaassen, Leora Klapper and especially Inessa Love for many helpful comments and suggestions. Address correspondence to: Neeltje van Horen, Development Prospects Group, World Bank, 1818 H Street MSN MC4-421, Washington, DC 20433, United States, Phone: 202-4587610, E-mail: Nvanhoren@worldbank.org. The findings, interpretations, and conclusions expressed in this paper are entirely those of the author and do not necessarily represent the views of the World Bank.

1. Introduction

Trade credit is created whenever a supplier offers terms that allow the buyer to delay payment.[1] Evidence shows that trade credit is an integral part of doing business for a large number of firms. Petersen and Rajan (1997) and Atanasova and Wilson (2002) show respectively that 70 percent of small U.S. firms and 80 percent of firms in the U.K provide credit to their customers. Furthermore, a yearly survey of the Central Bank of Mexico shows that in the first half of 2004 on average about 76 percent of the Mexican firms provided trade credit to their suppliers. A striking feature of the data from the Mexican Central Bank is that small Mexican firms are more likely to provide trade credit than their larger counterparts. As small and medium enterprises, especially in developing countries, are typically more financially constrained than large firms (Beck, Demirguc-Kunt and Maksimovic (2004)), these survey results raise the question why do firms, even when they are financially constrained, provide trade credit to their customers?

Several possible motives for the provision of trade credit by firms have been introduced in the literature. First, trade credit might be used as a way to reduce transaction costs between seller and buyer (Ferris (1981). Alternatively, suppliers may provide trade credit because they have a long term interest in the survival of the customers (Cunat (2000); Wilner (2000)). Finally, suppliers may have an information, controlling and enforcement advantage over banks that gives them a cost advantage when offering credit to a buyer that is financially constrained. As a result trade credit can be used to redistribute funds from financially stronger firms to firms that are constrained by lack of finance (see for example Smith (1987), Mian and Smith (1992); Biais and Gollier (1997); and Cunat (2000)).[2]

However, these theories do not provide a satisfactory explanation why so many *small* firms, for whom providing trade credit in general is expensive, sell their goods on credit. In this paper we suggest an alternative motive that can potentially explain why

[1] The customer can also provide trade credit to its supplier through the advance payment of money, so called customers credit. However, we do not study this type of trade credit.

[2] For an extensive review of theoretical and empirical literature on trade credit see Mian and Smith (1992), Smith (1995) and Petersen and Rajan (1997).

firms, especially small, young and financially constrained ones, sell their goods on credit: the use of trade credit as a tool to be competitive.

Trade credit can be looked upon as a competitiveness tool in two ways. One, it allows the supplier to give easier terms of payment to a potential customer. This effectively lowers the price for the product especially for potential customers that are financially constrained. In other words, the provision of trade credit enables suppliers to price-discriminate (Smith (1987); Brennan, Maksimovic and Zechner (1988)). Two, as trade credit gives the customer time to test the good and possibly return it, it indirectly works as quality insurance (Smith (1987)). By offering trade credit the supplier can give the customer an opportunity to test the product without pay, potentially making the product more interesting than similar products of competing suppliers.

If firms use trade credit as a competitiveness tool, a phenomenon that we will dub *trade credit competition*, the market structure in which the firm operates should have a large explanatory value in the percentage of goods the firm sells on credit. If the supplier is faced with a customer with large bargaining power he is more likely to provide trade credit as the customer can credibly threat to move to another supplier. If the supplier functions as a monopolist he will less likely provide trade credit, as customers have no option to move to another supplier.

To examine the use of trade credit competition in developing countries we use a new dataset based on survey studies recently conducted by the World Bank. This dataset contains information on almost 18,000 firms, mostly small and medium enterprises, in 42 developing countries dispersed over all regions. A major advantage of the survey is that information about customer bargaining power can be derived directly from the survey. Furthermore, the survey-based nature of the dataset allows us to test whether firm characteristics affect the use of trade credit competition by suppliers. In addition, as the surveys are conducted in a large number of developing countries, we can examine the impact of country characteristics like the development of the financial and legal system, on the use of trade credit as a competitiveness tool.

We find evidence that the market power of the customer has a positive impact on the provision of trade credit while the market power of the supplier has a negative impact. This is consistent with the idea that firms use trade credit as a competitiveness tool. We

also find that small and young firms and firms that lack access to finance are more inclined to use trade credit as a tool to sell products. This suggests that reputation of the supplier is an important determining factor in its need to use trade credit competition. Thus the use of trade credit to lock in customers seems to provide an explanation for the provision of trade credit by firms for whom selling goods on credit is relatively expensive. Exploiting the cross-country variation in our data we find that customers exert less market power in countries where the banking sector is relatively well developed. This indicates that the use of trade credit to lock in customers is more prevalent in countries were information is limited. The development of the legal system, on the other hand, proves to have no effect on the use of trade credit competition.

The paper builds on and extends earlier work done on the use of trade credit. It adds to the literature that tries to explain why trade credit is so prevalent amongst firms (see, for example, Petersen and Rajan (1997) for an overview). A number of papers in this area already have considered the impact of supplier market power (Petersen and Rajan (1995); McMillan and Woodruff (1999); and most notably Fisman and Raturi (2004)); however the impact of customer market power on the provision of trade credit has not received attention. Furthermore, most of the research in this area has concentrated on industrialized countries due to unavailability of data from developing countries. Only a few studies have examined the determinants of supply of trade credit in developing countries (Fafcamps (1997) (Zimbabwe); McMillan and Woodruff (1999) (Vietnam); and Fisman and Raturi (2004) (five African countries)). The new dataset we use in this paper allows us to get a better understanding of the reasons behind the use of trade credit by firms in developing countries. In addition, due to the large cross-country variation the impact of specific country characteristics on the provision of trade credit can be studied. This relates our research to the literature that looks at the relationship between the use of trade credit and the development of a country's financial and legal system as examined by Demirgüç-Kunt and Maksimovic (2002). Our paper complements their study as it focuses mainly on small and medium enterprises in contrast to publicly listed firms in their sample.

The rest of the paper proceeds as follows. The next section discusses the theory and states the hypotheses. In Section 3 the data are described. Section 4 lays out the empirical strategy, while the results are presented in Section 5. Section 6 concludes.

2. Theory and Hypotheses

In the literature a number of theories have been developed that attempt to provide an explanation why suppliers are willing to sell their goods on credit. Ferris (1981), for example, argues that firms provide trade credit to lower transaction costs. By separating the exchange of goods from the exchange of money, trade credit substantially reduces the costs involved in paying and administering invoices between suppliers and buyers who undertake regular exchanges of goods and services. Evidence supporting the transaction motive has been found by Ferris (1981), Long, Malitz and Ravid (1993) and Nilsen (2002).

In addition, suppliers may provide trade credit because they have a long-term interest in the survival of a customer. Especially when the bulk of a supplier's sales are to one firm, the supplier will have an incentive to provide finance to secure the survival of the customer when it faces a temporary liquidity problem. (Cunat (2000); Wilner (2000)). Love, Preve and Sarria-Allende (2003) find that during the Asian crisis trade credit indeed functioned as a transmission mechanism through which bank credit was redistributed from firms with a strong financial position to financially weaker ones.

Alternatively, suppliers can have a number of advantages over banks that can give them a cost advantage in offering credit to a buyer. First, suppliers can assess the creditworthiness of a buyer during the normal course of business, making it easier for them to evaluate credit risk. Second, the supplier is also more likely to be able to enforce repayment since he can credibly threat to cut off future supplies. Third, in case of buyer default, the supplier can seize the goods that are sold. Consequently, firms with a strong financial position can use trade credit to intermediate funds to firms that lack this access (Smith (1987); Mian and Smith (1992); Biais and Gollier (1997); Cunat (2000)).

Here we provide an alternative motive for the provision of trade credit by firms, one that can account for the fact that trade credit is also offered by firms that are

financially constrained and for whom trade credit is thus relatively expensive: the use of trade credit as a competitiveness tool.

Trade credit can function as a competitiveness tool in two ways. One, it allows the supplier to give easier terms of payment to a potential customer. This effectively lowers the price for the product especially for potential customers that are financially constrained. In other words, the provision of trade credit enables suppliers to price-discriminate (Smith (1987); Brennan, Maksimovic and Zechner (1988)). Two, as trade credit gives the customer time to test the good and possibly return it, it indirectly works as quality insurance (Smith (1987)). So by offering trade credit the supplier can give the customer an opportunity to test the product without pay, potentially making the product more interesting than similar products of competing suppliers. We dub the use of trade credit as a competitiveness tool trade credit competition.

If trade credit competition is indeed a reason for firms to provide trade credit the market structure in which the firm operates should have a significant impact on the percentage of goods sold on credit. If the supplier sells its products to a customer with strong market power, he is more likely to sell goods on credit as the customer can credibly threat to move to another supplier. In addition, a supplier who faces hardly any competition from other firms in the market will be less likely to provide trade credit as customers have no option to move to another supplier.[3] Our *"trade credit competition" hypothesis* summarizes this:

Hypothesis 1a: Suppliers who sell to customers with large market power sell a larger percentage of their goods on credit.

Hypothesis 1b: A monopolist provides less trade credit than a supplier in a competitive market.

[3] Fisman and Raturi (2003) look at the relationship between the monopoly power of the supplier and the provision of trade credit and also find a negative relationship. However, their argument differs from the one posed in this study. They argue that since trade credit is only provided when there is trust that the loan will be repaid, relationship-specific investments need to be made by the customer. The customer will only do that in a competitive market because only then it can extract part of the surplus as it can potentially shift to another supplier. So monopolists will provide less trade credit as borrowers are deterred from investing in establishing creditworthiness.

Most theories explaining the provision of trade credit implicitly assume that the decision to provide trade credit is made at the discretion of the supplier. The decision is based on whether the firm has the sources to provide it and the creditworthiness of the receiving customer, with the customer making the decision to use the credit or not. Hypothesis 1a, however, introduces the possibility of role-reversion: it is not the supplier that chooses to provide credit to a "well-behaving" customer, it is the customer that forces the supplier to provide trade credit threatening to move to another supplier in case of refusal.

In the literature a number of firm-specific characteristics have been identified that impact the use of trade credit. Besides the direct impact these firm characteristics have on trade credit, they can also potentially impact the use of trade credit indirectly through their effect on the use of trade credit competition by suppliers. A number of hypotheses can be distinguished that capture possible interaction effects between firm-specific characteristics and the use of trade credit as a competitiveness tool.

The first firm-specific characteristic that can potentially affect the use of trade credit competition is reputation of the firm. A number of theories have been developed arguing that trade credit provision requires an established relationship between buyers and sellers (Smith (1987); Cunat (2000); and Wilner (2000)). This explains the positive link between age of a firm and the levels of account payables found in many empirical studies (Petersen and Rajan (1997) and Cunat (2000), among others). Furthermore, as relationship-building takes time, the need for an established relationship is one possible factor that explains why older firms in general provide more trade credit than younger firms. With respect to the *"trade credit competitiveness" hypothesis* this argument would imply that when a relationship is young, firms in a competitive industry do not provide more trade credit than monopolistic suppliers.

However, when trade credit is used as a competitiveness tool by firms selling to customers with strong market power, the link between the provision of trade credit and the length of the relationship with the customer might be reversed. One could argue that when customers have large bargaining power firms that lack a solid reputation are more likely obliged to sell the goods on credit in order to make the sale. Suggesting a negative correlation between reputation of the firm and the supply of trade credit to large

customers. The relation between reputation and the use of trade credit competition is summarized in the "*reputation" hypothesis:*

Hypothesis 2a: Firms that lack a solid reputation will provide trade credit to customers with large bargaining power compared to firms with a good reputation.

Hypothesis 2b: Lack of reputation decreases the difference between the percentage of goods sold on credit by a competitive supplier and a monopolist.

Petersen and Rajan (1997) have pointed out that buyer reputation and credit rating can reduce concerns about non-payment. Their argument provides an additional explanation why firms dealing with customers with strong market power sell more goods on credit relative to firms with small customers. In other words a positive relation between customer market power and the provision of trade credit does not necessarily have to reflect the occurrence of trade credit competition.

The *"reputation" hypothesis*, however, should provide additional information as to whether competitiveness issues do play a role. If the reputation hypothesis holds, small and young firms, i.e. firms that lack a solid reputation should provide more trade credit to customers with large market power. As trade credit is relative expensive for these firms it is more likely that their credit provision, as opposed to the credit provision of large firms, is driven by competitiveness issues than by the fact that large customers or multinationals pose less credit-risk. In other words, an acceptance of the *"reputation" hypothesis* can be interpreted as evidence that a positive correlation between the provision of trade credit and customer market power is (at least partly) driven by competitiveness considerations.

If trade credit competition is perceived by all firms, regardless their standing with (potential) customers, as an effective tool to sell products, one would expect that firms with more access to external sources of finance use trade credit more extensively as a competitiveness tool. If this *"capital-availability" hypothesis* holds, firms with access to external sources of finance sell more goods on credit to customers with large bargaining

power as compared to firms that lack this access.[4] Similarly, the difference in trade credit provided by a monopolist and a competitive supplier should, under these assumptions, be positively related with the financial strength of the firm. Note that the *"capital availability" hypothesis* is an alternative to *the "reputation" hypothesis* as firms that have build a solid reputation in general are also firms that have access to external sources of finance, i.e. the two hypotheses are opposite. The *"capital availability" hypothesis* can be summarized as follows:

Hypothesis 3a: Firms with access to external sources of finance are more likely to provide trade credit to customers with large bargaining power.

Hypothesis 3b: Access to finance increases the difference between the percentage of goods sold on credit of a competitive supplier and a monopolist.

Another possible firm-specific characteristic that can impact the use of trade credit competition is the type of good sold. The need for quality insurance is higher when the goods sold are heterogeneous as opposed to homogeneous. For example Long, Malitz and Ravid (1993) find that firms producing products whose quality requires longer to assess are more likely to extend trade credit relative to sales. This suggests that customers that buy highly technical products are more likely to demand quality insurance than customers that buy commodities, and as a result more strongly exercise their market power. Similarly, the difference between a monopolist and a competitive supplier in their provision of trade credit should decrease when the supplier produces more sophisticated products. We refer to this hypothesis as the *"need for quality insurance" hypothesis*:[5]

[4] Note that the argument put forward here differs from, but does not contradict, the so-called redistribution view of trade credit. This view suggests that firms with access to external sources of finance function as intermediaries for firms that lack this access as suppliers have an information, controlling and enforcement advantage over banks (see for example Smith (1987), Mian and Smith (1992), Biais and Gollier (1997) and Cunat (2000)).

[5] An additional potential interesting hypothesis is whether trade credit competition is more prevalent when goods are internationally traded. Unfortunately, we cannot test whether this is indeed the case as all our competitiveness variables (discussed in the next section) are based on the market power of both supplier and customer in the firm's domestic market.

Hypothesis 4a: Firms producing technical products are more likely to provide trade credit to customers with large bargaining power.

Hypothesis 4b: The difference between the percentage of goods sold on credit of a competitive supplier and a monopolist decreases when the goods sold are technical.

Besides firm characteristics also certain country characteristics, like the development of the financial and legal system can potentially influence the use of trade credit as a competitiveness tool. As argued by Demirgüç-Kunt and Maksimovic (2002) the development of a country's banking system and the use of trade credit by firms can theoretically either be substitutes or complements. They find evidence that the two are complements, which implies that it is efficient for firms to supply credit, even if they have to borrow to do so, as firms have advantages in evaluating loans and enforcing payment over pure financial intermediaries.[6]

Besides having a direct effect on the provision of trade credit, the development of the financial sector can also possibly have an indirect effect through its impact on the use of trade credit competition. When a financial system is relatively well developed more information is available on firm's credit histories. This information can serve as a guarantee for product quality, making customers less likely to exert market power when the financial system is well developed. Similarly, the increase of available information can explain a reduction in the difference between trade credit provided by monopolists and competitive suppliers. Since more information is available on firms' credit histories the need for a supplier to use trade credit as a tool to lock in customers diminishes. The impact of the development of the country's banking system via the information channel is summarized in the *"information" hypothesis*:

Hypothesis 5a: In a country with a well-developed banking system customers with large bargaining power will receive less trade credit.

[6] Similarly Frank and Maksimovic (1998) and Biais and Gollier (1997) argue that the use of trade credit complements the existence of a well-functioning banking sector.

Hypothesis 5b: A well-developed banking sector decreases the difference between the percentage of goods sold on credit of a competitive supplier and a monopolist.

In addition to more available information, the development of the banking sector implies that on average more credit is available for domestic firms. Under the assumption that the reasons for use of trade credit competition remain unchanged, the increase in capital available would imply a higher use of trade credit competition in these countries. Furthermore, in a country with a well-developed financial system the risk of holding account receivables is relatively small as there often exists the potential of selling them to a factoring company. This positive relation between the development of a country's banking sector and the use of trade credit competition is posited in the *"credit-availability" hypothesis*. This hypothesis is the opposite of the *"information" hypothesis*, and states that:

Hypothesis 6a: Customers with large bargaining power will receive more trade credit in a country with a well-developed banking sector.

Hypothesis 6b: A well-developed banking sector increases the difference between the percentage of goods sold on credit of a competitive supplier and a monopolist.

Demirgüç-Kunt and Maksimovic (2002) show that the development of the legal system and the usage of trade credit are negatively correlated. This can be explained by the fact that efficiency in legal systems is more important for financial intermediaries than for suppliers in their risk exposure, as banks are more in need to resort to legal recourse in order to solve non-repayment of credit. Trade creditors are in a better position to punish debtors without resorting to the legal system for example because they can withhold further deliveries. When law and order is strong bank credit will be easier to come by

lessening the relative importance of trade credit, especially when bank and trade credit are substitutes.

There does not seem to exist a direct reason why there would be a relationship between the development of the legal system and using trade credit as a competitiveness tool. Even though when rule of law is weak and firms have no legal recourse in the case of credit non-payment, the impact of this will not be very substantial. Suppliers, in contrast to financial intermediaries, have ways to mitigate the problems of credit protection for example because they can credibly enforce payment by threatening to cut off future supplies. This leads to the final hypothesis referred to as *"constant impact legal system" hypothesis*:

Hypothesis 7a: The development of the legal system will leave the impact of customer bargaining power on trade credit provision unaffected.

Hypothesis 7b: The difference between the trade credit provision of a competitive supplier and a monopolist is unaffected by the development of the country's legal system.

3. Data

The data used in this paper come from the World Bank Investment Climate Unit (ICU)-Firm Level Survey study. This project is an initiative of the World Bank to get a better understanding of the impact of a country's investment climate on enterprise performance and international competitiveness. The main focus of the survey is on microeconomic and structural dimensions of a nation's business environment, viewed in an international process.

Starting in 2000 surveys have been carried out in a number of developing countries, and more will be conducted in the future. In general a survey is conducted once in each country, but occasionally the survey was conducted twice. A major focus of the project is to provide information that is comparable across countries, regions and/or income-levels (and in some cases even comparable on a sub-national regional level). With this objective in mind recently a core set of questions has been developed and all country

surveys need to include at least 85 percent of these questions. However, some of the surveys conducted previously contain questions that are not comparable to this Core. As cross-country comparison is important for our purpose we use the dataset based on the Core, accepting that some of the countries in the sample only provide information on a subsample of the questions.

The survey comprises of quantitative indicators such as sales, supplies, ownership, sources of finance and employment levels, along with qualitative questions dealing with the opinion of the firm's manager on the business environment and with his motivation to do business. Questions relating to age, legal status and ownership of the firm apply to the entire firm, including all establishments (factories, stores and/or service outlets), while the remaining questions are answered with respect to the establishment at which the survey was conducted.[7]

This database is unique for a number of reasons. First, it provides information for a large group of developing countries dispersed over all regions, making cross-country comparison possible. Currently data are available for 43 countries from which 42 provided information on the use of trade credit in sales. Table 1 shows the number of firms in each country with information on the provision of trade credit.[8] Second, the vast majority of the firms surveyed are small and medium enterprises and especially for these firms cross-country data have not been readily available. Third, and especially important for our purpose, this database explicitly provides information about the type of customers the surveyed firm is doing business with. This has the major advantage that information about customer bargaining power can be derived directly from the survey and thus does not have to be proxied for example by looking at industry concentration levels.

[7] However, 74 percent of the firms in our sample has only one establishment and of the remaining 26 percent about half consists of two establishments.

[8] In seven countries in our sample two surveys were conducted (India, Kyrgyz Republic, Moldova, Poland, Serbia and Montenegro, Tajikistan and Uzbekistan). For each country we only use one survey as to avoid that firms enter the dataset twice. For India the last survey is used as this survey includes most of our variables of interest. For the other countries the first survey is used as the latter survey mainly focuses on balance-sheet data.

4. Empirical Strategy

The survey provides a measure of provision of trade credit, as the respondents were asked what percent of the establishment's sales were sold on credit. This gives us a dependent variable (*soldoncred*), which shows variability beyond the yes or no distinction of a dummy variable often used in this type of studies.

Our dependent variable shows a concentration around zero and 100 percent so OLS regression is not appropriate as it fails to account for the qualitative difference between limit (zero and 100) observations and nonlimit (continuous) observations. Therefore we treat *soldoncred* as a censored variable, with the percentage of sales sold on credit only observed when it falls between zero and 100 percent and use as our regression model a standard tobit model with two-sided censoring.[9]

The survey contains information about the market power of both the supplier and its customers that allows us to test whether trade credit is used as a competitiveness tool. Our variable measuring consumer market power, *conspower*, equals the percentage of domestic sales sold by the firm to multinationals located in the firm's home country and to large domestic firms (those with approximately 300 plus workers). These are firms that are more likely to have large bargaining power when it comes to the suppliers they choose, especially when they buy inputs from small enterprises.

The market power of the supplier is determined by using the answers to the survey question whether raising prices of the main product would alter the quantity demanded from customers. We created a dummy variable called *monop*, which is one if the firm answered that customers would continue to buy the same quantities if prices would increase and zero otherwise.

To study the heterogeneous firm responses to the use of trade credit competition we interact a number of firm characteristics with our two competitiveness variables. In order to test the validity of the *"reputation" hypothesis* we use two well-established proxy variables of reputation: the size of the firm and its age. Our variable *size* equals the log of the number of permanent plus temporary employees and our variable *age* matches the log of the age of the firm.

[9] A two-side censored tobit model is also used by McMillan and Woodruff (1999) who have a comparable dependent variable.

Another variable that can give information about the reputation of the firm is whether it has access to external sources of finance. Using access to finance as a proxy for reputation is based on the premise that firms that have no access to external sources of finance are firms that are not perceived as creditworthy by financial institutions and as a result are more likely to lack sufficient reputation with their customers.

We construct a variable that measures the access of a firm to domestic as well as to foreign sources of finance, *access*. It is a dummy which is one if the firm has a relationship with a domestic bank or has access to the foreign capital markets. Firms are said to have access to foreign capital markets if they have a relationship with a foreign owned commercial bank, if any of their borrowing is in foreign currency, if a foreign company is the largest shareholder or owner, or if the firm has holdings or operations in other countries.

The *"capital availability" hypothesis* is the direct opposite of the *"reputation" hypothesis* and we can test both hypotheses simultaneously. Like access to finance can proxy for reputation of the firm so can *size* and, to a lesser extent, *age* proxy for access to finance as larger (and older) firms are in a better position to find external sources of finance as they are perceived to be more creditworthy.

In order to determine whether the *"need for quality insurance" hypothesis* holds we need to construct a variable that can capture the technological content of the firm's products to interact with our two competitiveness variables. We created a variable *tech* which is one if the firm indicated in the survey to have developed a new product line and/or a new technique that substantially changed the way the main product is produced in the last three years and/or received ISO certification and zero otherwise.

To analyze the impact of country differences on the use of trade credit as a competitiveness tool, we interact variables capturing the development of the banking sector and of the legal system with our competitiveness variables *conspower* and *monop*. To examine the validity of the *"information"* and *"credit availability" hypotheses*, we use the ratio of the claims on the private sector by deposit money banks to GDP, *private*. This variable has been used in previous studies examining the impact of differences in

financial system development across countries (see, for example, Rajan and Zingales (1998), and Demirgüç-Kunt and Maksimovic (2002)).[10]

To test whether the development of the legal system indeed has no effect on the use of trade credit competition we use an index produced by International Country Risk Rating agency that captures for each country the efficiency of the state in enforcing property rights. This measure, *legal*, reflects the degree to which the citizens of a country are willing to accept the established institutions to make and implement laws and adjudicate disputes. The measure ranges from one to six, with a low value indicating that claims in general are settled by physical force or illegal means, while a high value implies that sound political instruments and a strong court system exist in the country. This indicator has been used in previous studies comparing institutions in different countries (see, for example, Knack and Keefer (1995) and Demirgüç-Kunt and Maksimovic (2002)).[11]

Table 2 contains the sample statistics of the variables we consider. In addition to the competitiveness variables, *conspower* and *monop*, and the various interaction terms discussed above, we control for some potential firm-specific determinants of the provision of trade credit. These include both age of the firm and the number of employees. We allow the relationship between both *age* as well as *size* and the provision of trade credit to be non-linear. Additional years of the firm add significantly to a firm's reputation early in life, but will have little effect later. A similar argument can be made for the size of the firm. Furthermore, we include *access* as control variable to account for the fact that firms with access to finance potentially pass on funds to financially more constrained firms.

Also the export content of the firm's sales can potentially impact the percentage of goods sold on credit (see for example Ng, Smith and Smith (1999)). International compared to domestic customers are more likely to experience delivery delays and be

[10] In the case of China *private* is extremely high (1.2 on average) making China an outlier. As a result we have excluded China from the regressions. In addition, data on claims on the private sector by deposit money banks were not available for Albania, Serbia and Montenegro, and Uzbekistan. As a result, for these regressions the number of countries in the sample is smaller.

[11] For a number of countries in our sample no indicator for the development of the legal system is available. These are Bosnia and Herzegovina, Cambodia, Macedonia FYR, Georgia, Kyrgyzstan, Tajikistan, and Uzbekistan. As a result, for these regressions the number of countries in the sample is smaller.

unfamiliar with the seller. Because of these increased risks an international buyer will more likely demand trade credit. A positive relationship can also be the result of international customers potentially being more creditworthy, which will make it less risky for the seller to provide trade credit. However, from the supplier's perspective dealing with an international customer can also intensify information problems concerning credit quality and therefore the seller is more likely to demand cash payments. In other words, the effect of export on trade credit provision can work two ways. As to control for the impact of this, we created a dummy variable *export*, which is one if the firm exports at least 25 percent of its products directly (exports through a distributor are not taken into account).[12]

To correct for the possibility that the provision of trade credit is sector driven, sector dummies are included: manufacturing, services, construction, agroindustry and other firms. To control for country-specific differences in the provision of trade credit, country dummies are included. When the impact of the development of the financial and the legal system on the use of trade credit competition is assessed, additional country variables are included to control for country differences not captured by the variables *private* and *legal*. Following Demirgüç-Kunt and Maksimovic (2002) we include three macroeconomic variables that can potentially affect the provision of trade credit. First, real GDP per capita (*gdpcap*) which controls for the economic development of the country. Second, the growth rate of per capita real GDP (*growth*) to control for potential business-cycle effects, and third, the rate of inflation (*inflation*) which may proxy for the willingness to enter into long-term financial contracts rather than short-term trade credit.

Table 3 shows the correlation matrix for the variables in our study. Our competition variables show the expected correlations. Customer market power is associated with more trade credit while monopoly power of the supplier with less trade credit, a preliminary indication that trade credit competition does play a role in a firm's decision to provide trade credit.

[12] An increase in the minimal percentage of direct exports in total sales to 50 percent would make the concentration of non-exporters too large (i.e. more than 90 percent). However, we tested whether the estimation results were robust to other cutoffs. This was indeed the case.

5. Results

The main focus of this paper is establishing whether competitiveness plays a role in the decisions of firms in developing countries to provide trade credit and, if so, whether firm and country characteristics influence the use of trade credit competition. Table 4 presents our results. To aid the economic interpretation we show, instead of parameter estimates, the marginal effects for the unconditional expected value of the dependent variable, E(y*), where y*=max(*a*, min(y,*b*)) where *a* is the lower limit for left censoring (0) and *b* is the upper limit for right censoring (100). To accommodate for possible heteroskedasticity all standard errors are robust.

The first column in table 4 tests the *"trade credit competition" hypothesis*. The results indicate that competitiveness is indeed a reason for firms to provide trade credit. The positive correlation between *conspower* and the percentage of goods sold on credit, significant at the one percent level, suggests that the willingness to provide trade credit is dependent on the customer's market power. When customers have large market power, the supplier is more likely to provide trade credit, than when the customer is a small firm. The impact of customer market power on the provision of trade credit is economically relevant. If a firm sells 50 percent of its products to a multinational or to large companies instead of zero percent, the provision of trade credit will be 5.9 percent higher. This is a substantial increase considering that the median firm in our sample sells 30 percent of its goods on credit.

Like Fisman and Raturi (2004) we find that an increase in monopoly power lessens the provision of trade credit. The result is significant at the one percent level and economically sizeable. A monopolist provides 5.1 percent less trade credit compared to competitive suppliers. Following the trade credit competition argument this negative relationship is driven by the fact that customers of competitive suppliers, in contrast to the ones of monopolists, have an option to move to another supplier and therefore the competitive seller has a stronger incentive to provide trade credit to lock in customers.

In the next three columns we interact the two competitiveness variables *monop* and *conspower* with the variables that proxy for reputation: *age*, *size*, and *access*. This allows us to test our *"reputation" hypothesis* versus the *"capital availability" hypothesis*. The results show that both size and age of the firm negatively affect the need to provide

trade credit to customers with large market power. This is consistent with the *"reputation" hypothesis*. Suppliers that mainly sell to multinationals or large corporations need to provide more trade credit, however, when they are large themselves or are already in business for several years it becomes easier to decline a potential demand for trade credit made by these customers without loosing their business. The magnitude of the interaction may be thought of in the following terms. A move from the 75th percentile of size to the 25th percentile will widen the gap between a supplier who sells zero percent and one that sells 50 percent of its goods to large customers by 4.7 percent.[13]

The negative interaction between access to domestic and foreign sources of finance and *conspower* also provides evidence in favor of the *"reputation" hypothesis.*[14] The gap between a firm selling zero percent to large customers and a firm selling 50 percent to large customers will be narrowed by almost three percent if the firm has access to external sources of finance. These results suggest that firms that lack a solid reputation in the market use more trade credit competition.

The fact that especially small, young and financially constrained firms provide trade credit to customers with high market power is an indication that the positive correlation between customer market power and the provision of trade credit by firms is to a large extent driven by the urge to be competitive. Even though the high credit-quality of multinationals and large firms might partly explain why they receive more trade credit as suggested by Petersen and Rajan (1997), the fact that small and young firms and firms that lack access to external sources of finance provide more trade credit, even though the provision of trade credit is relative expensive for them, indicates that lower credit risk is unlikely to be the sole explanation, as these firms need a clear motivation as to why they provide trade credit.

[13] The difference in size between the 25th and 75th percentile is 2.35, this multiplied by an increase of the percentage of goods sold to large firms with 50 percent and the marginal effect of the interaction term implies a change in the percentage of goods sold on credit of 4.7 percent.

[14] As a robustness check we created two variables capturing access to finance, one capturing access to domestic finance and the other access to foreign finance, as to accommodate for the possibility that firms with access to foreign sources of finance have a better reputation. Both domestic as well as foreign access to finance had a significant negative effect on the impact of customer power on trade credit. The interaction with *monop* was in both cases insignificant. We have omitted the result for brevity. They are available from the author upon request.

We find no significant evidence that lack of reputation reduces the negative correlation between monopoly power and the percentage of goods sold on credit. This result contrasts with the result found by Fisman and Raturi (2004), that the length of the relationship between supplier and his customer indeed increases the negative impact of monopoly power on the provision of trade credit. This difference might be caused by the fact that their measure of reputation is customer-supplier relationship specific, while our measure only provides a broad proxy for reputation.

We find substantial evidence that a company's reputation has a significant impact on the market power exerted by its customers. However, also the type of goods produced, like the level of technically advancement, potentially affects the use of trade credit competition. The results of interacting our competitiveness variables with *tech* can be found in column five of table 4. Examining the interaction effects we find that the impact of customer market power is unaffected by whether the product made is technically advanced or not. Similarly, the interaction between *tech* and *monop* is also insignificant. It is possible that the market power exerted by the customer when the firm sells technically advanced goods does not lead to an increase in the percentage of the goods sold on credit, but is reflected in modified credit conditions, such as longer terms of credit as to allow the customers a longer time to test the quality of the product (Long, Malitz and Ravid (1993)). Unfortunately we have no information on the terms of trade credit, thus testing for this is not possible.

The impact of country characteristics on the use of trade credit competition is shown in the last two columns of table 4.[15] In both specifications we find a negative relation between the provision of trade credit and the development of the legal system, consistent with the results found by Demirgüç-Kunt and Maksimovic (2002). Contrary to their results, we also find a negative correlation between the development of the financial system and the provision of trade credit. This suggests that the development of the country's banking system and the use of trade credit are substitutes instead of complements. A possible explanation for this negative relationship is that information

[15] In all these regressions the country variables are based on the year that coincides with the year of the survey questions. However, as a robustness check we estimated the same regression taking the country variables as the average of the year that coincides with the survey questions and the two preceding years. This did not affect our main results

about firms' credit histories is more readily available which makes the need for trade credit to lock in customers less important.[16] This is especially likely to affect small and medium enterprises. The fact that Demirgüç-Kunt and Maksimovic (2002) look at publicly listed firms in both developed and developing countries and our dataset contains mainly small and medium enterprises might explain the contrasting results.

The negative and significant interaction between *conspower* and the development of the financial sector suggests that customers are less likely to exert their market power when information about firms is more widely available, as this information can serve as a guarantee for product quality. Consider a move from the country at the 25th percentile of financial development (Russia) to a country at the 75th percentile (Hungary). This will narrow the gap of goods sold on credit between a firm selling zero percent to large customers and a firm selling 50 percent to large customers with 3.3 percent.[17] The evidence confirms part a of the *"information" hypothesis.* However, we find no evidence that the development of the banking sector influences the difference in trade credit provision between monopolists and suppliers in a competitive market.

The results in the last column of table 4 are consistent with our *"constant impact legal system" hypothesis*. The insignificance of the interaction term suggests that when rule of law is weak firms have ways to mitigate problems of credit protection in contrast to banks. As a result, the development of the legal system leaves the use of trade credit competition unaffected.

The coefficients of the control variables in all equations are as expected. Both firm size and age, proxies for the reliability and reputation of a company, are large and highly significant, with the significance of the squared term indicating that the size of the effect is decreasing over size and age. Similarly, the coefficient on *access* is also positive and

[16] As suggested by Fisman and Rature (2003), customers have to invest in relationship building before receiving trade credit. Because of the relationship-specific cost involved the customer will not easily shift to another supplier once the relationship is established. This provides security for the supplier that customers will not intentionally default on the trade credit received and thus makes it less risky for the supplier to provide trade credit to lock in a customer. When information about the creditworthiness of the customer is more readily available it is easier for the customer to switch from one supplier to another. This increases the risk of intentional default and as such has a negative effect on the provision of trade credit.

[17] The difference in private between the 25th and 75th percentile is 0.19, which multiplied by the marginal effect of –0.35 and the change in percentage of goods sold to large customers amounts to a drop in trade credit provided of 3.3 percent.

highly significant. This finding indicates that a firm with access to finance, whether domestically or through the international capital markets, sells more goods on credit than a firm without this access.[18] This result is consistent with the results found by, for example, Petersen and Rajan (1997).

The positive sign of *export*, significant at the five percent level in most specifications, indicates that exporters provide more trade credit to their customers. This positive relation can be explained by the fact that international customers are more creditworthy, or alternatively by the fact that the quality risk faced by international customers overrides the increased credit risk faced by the exporters. This result is in line with Ng, Smith and Smith (1999) who find that selling to international customers marginally increases the likelihood of the seller adopting two-part trade credit (i.e. trade credit where the buyer is offered a discount for prompt payment).

Similarly the country-level control variables are consistent over all specifications. There exists a positive relationship between the use of trade credit and the economic development of the country, a negative correlation between growth and trade credit and a negative relationship, albeit not always significant, between inflation and the use of trade credit.

The inclusion of both competitiveness variables *conspower* and *monop* in order to test our hypotheses, is preferred as it avoids the possibility that the results are driven by an omitted variable bias. However, this approach has a significant downside. A number of countries in our sample have no information about the monopoly power of the supplier. These countries are Bangladesh, China, Ethiopia, India, Kenya, Mozambique, Pakistan, Peru, The Philippines, and Uganda. As a result cross-country and regional variation is limited in the specifications used in table 4.

To determine whether adding additional countries has an impact on the results and thus to check the robustness of our conclusions, we exclude the variable *monop* from the regressions and estimate each specification again with the extended sample. The results can be found in table 5.

[18] We have also estimated all regressions using to separate variables capturing access to domestic and to foreign sources of finance as control variables. Both variables were highly significant in all specifications with the expected positive sign. The results are available upon request.

Our earlier findings are robust to the exclusion of *monop* and the consequential increase in the number of countries in our sample. Again we find a positive and highly significant relation between the market power of the customer and the percentage of goods a firm sells on credit. A good reputation, as measured by the firm's age, size and its access to domestic and foreign sources of finance, lessens the need to use trade credit competition. In addition, the impact of customer bargaining power is higher in countries with a less developed banking system, while the country's legal system has no impact on the use of trade credit competition.

6. Conclusions

Statistics show that the use of trade credit by firms in both developed and developing countries is widespread, even when these firms are financially constrained and thus face relative high costs when providing trade credit. In this paper we argue that a possible explanation for this extensive use of trade credit is that it can function as a competitiveness tool. If the supplier's customers have strong market power the firm is more likely to sell its goods on credit as the customer can credibly threat to move to another supplier. Furthermore, a competitive supplier can use trade credit as a way to lock in customers. A monopolist, on the other hand, will be less inclined to provide trade credit as customers have no option to move to another supplier.

Using data from almost 18,000 firms, mostly small and medium enterprises, in 42 developing countries, we find strong evidence of the importance of competitiveness in the provision of trade credit. Our results suggest that a monopolist sells significantly less of its goods on credit, while customer market power proves to have a positive effect on the amount of trade credit a supplier provides. Furthermore, we find that on average small and young firms and firms that lack access to finance are more inclined to use trade credit as a tool to sell products. This suggests that reputation of the supplier is an important determining factor in a firm's need to use trade credit competition.

Examining the impact of institutional development we find that the development of the legal system, while negatively correlated with the provision of trade credit, hardly affects the use of trade credit as a competitiveness tool. Contrary, a better developed financial system lessens the market power exercised by customers, likely because more

firm-specific information is available which can function as a guarantee for product quality.

All in all, the results put forward in this paper suggest that trade credit competition is an integral part of doing business for firms in developing countries, especially for those firms that still have to establish a solid reputation in the market and firms located in countries with an underdeveloped banking sector.

References

Atanasova, C. and N. Wilson (2002), "Borrowing Constraints and the Demand for Trade Credit: Evidence from UK Panel Data," mimeo, Leeds University Business School.

Beck, T., A. Demirgüç-Kunt and V. Maksimovic (2004), "Financial and Legal Constraints to Firm Growth: Does Firm Size Matter?" mimeo, World Bank.

Biais, B. and C. Gollier (1997), "Trade Credit and Credit Rationing," *Review of Financial Studies*, vol. 10, pp. 903-937.

Brennan, M., V. Maksimovic, and J. Zechner (1988), "Vendor Financing," *Journal of Finance*, vol. 43, pp. 1127-1141.

Cunat, V. (2000), "Trade Credit: Suppliers as Debt Collectors and Insurance Providers," Discussion Paper Financial Markets Group London School of Economics, no. 365.

Demirgüç-Kunt, A. and V. Maksimovic (2002), "Firms as Financial Intermediaries: Evidence from Trade Credit Data," mimeo, World Bank.

Fafchamps, M. (1997), "Trade Credit in Zimbabwean Manufacturing," *World Development*, vol. 25, pp. 795-815.

Ferris, J. (1981), "A Transactions Theory of Trade Credit," *Quarterly Journal of Economics*, vol. 96, pp. 243-270.

Fisman, R. and M. Raturi (2004), "Does Competition Encourage Credit Provision? Evidence from African Trade Credit Relationships," *Review of Economics and Statistics*, vol. 86, pp. 345-352.

Frank, M. and V. Maksimovic (1998), "Trade Credit, Collateral, and Adverse Selection," UBC Working Paper.

Knack, S. and P. Keefer (1995), "Institutions and Economic Performance: Cross-Country Tests using Alternative Institutional Measures," *Economics and Politics*, vol. 7, pp. 207-227.

Long M., I. Malitz, and S. Ravid (1993), "Trade Credit, Quality Guarantees, and Product Marketability," *Financial Management*, vol. 22, pp. 117-127.

Love, I., L. Preve, V. Sarria-Allende (2003), "Trade Credit and Financial Crises," mimeo, World Bank.

McMillan, J. and C. Woodruff (1999), "Interfirm Relationships and Informal Credit in Vietnam," *Quarterly Journal of Economics*, vol. 114, pp. 1285-1320.

Mian, S. and C. Smith (1992), "Accounts Receivable Management Policy: Theory and Evidence," *Journal of Finance*, vol. 47, pp. 169-200.

Ng, C., J. Smith, and R. Smith (1999), "Evidence on the Determinants of Credit Terms used in Interfirm Trade," *Journal of Finance*, vol. 54, pp. 1109-1129.

Nilsen, J. (2002), "Trade Credit and the Bank Lending Channel," *Journal of Money, Credit, and Banking*, vol. 34, pp. 226-253.

Petersen, M. and R. Rajan (1995), "The Effect of Credit Market Competition on Lending Relationships," *Quarterly Journal of Economics*, vol. 110, pp. 407-443.

Petersen, M. and R. Rajan (1997), "Trade Credit: Theories and Evidence," *Review of Financial Studies*, vol. 10, pp. 661-691.

Rajan, R. and L. Zingales (1998), "Financial Dependence and Growth," *American Economic Review*, vol. 88, pp. 559-586.

Smith, J. (1987), "Trade Credit and Informational Asymmetry," *Journal of Finance*, vol. 42, pp. 863-872.

Smith, J. (1995), "Inter Enterprise Debt and Monetary Policy in the UK," mimeo, Bank of England.

Wilner, B. (2000), "The Exploitation of Relationships in Financial Distress: The Case of Trade Credit," *Journal of Finance*, vol. 55, pp. 153-178.

Table 1 - Number of Firms in Sample Countries

This table reports for each country the number of firms that provided information on the percentage of goods sold on credit

Country	No. Obs	Country	No. Obs	Country	No. Obs
Albania	129	Georgia	174	Peru	564
Armenia	169	Honduras	449	Philippines	681
Azerbaijan	167	Hungary	250	Poland	500
Bangladesh	998	India	1,788	Romania	255
Belarus	250	Kazakhstan	249	Russia	500
Bosnia & Herzegovina	175	Kenya	239	Serbia and Montenegro	393
Brazil	1,636	Kyrgyz Republic	171	Slovakia	163
Bulgaria	250	Latvia	175	Slovenia	188
Cambodia	502	Lithuania	200	Tajikistan	175
China	1,500	Macedonia, FYR	148	Tanzania	264
Croatia	187	Moldova	174	Turkey	514
Czech Republic	267	Mozambique	91	Uganda	299
Estonia	169	Nicaragua	452	Ukraine	258
Ethiopia	427	Pakistan	965	Uzbekistan	358

Table 2 - Summary Statistics

The summary statisics below are for the sample restricted to the firms with information on the percentage of goods sold on credit. For definition of variables and their sources see appendix.

	No. Obs.	Mean	Median	Std. Dev.
Dependent Variable				
Soldoncred	17,419	39.55	30.00	38.84
Competitiveness Variables				
Monop	9,771	0.17	0.00	0.37
Conspower	12,339	22.77	0.00	32.81
Firm variables				
Age	16,363	2.44	2.30	0.80
Size	16,429	3.66	3.42	1.68
Access	16,794	0.38	0.00	0.49
Tech	14,263	0.51	1.00	0.50
Export	15,518	0.16	0.00	0.37
Country variables				
Private	15,287	0.24	0.26	0.11
Legal	15,816	3.38	4.00	1.10
Gdpcap	17,231	1697.75	880.06	1624.64
Growth	17,231	3.64	3.22	2.93
Inflation	17,169	9.08	4.86	12.61

Table 3 - Correlation matrix

The correlation coefficients below are for the sample restricted to the firms with information on the percentage of goods sold on credit. ***, ** and * correspond to 1 percent, 5 percent and 10 percent significance levels respectively

	soldoncred	*conspower*	*monop*	*age*	*size*	*access*	*tech*	*exporter*	*private*	*legal*	*gdpcap*	*growth*
conspower	0.2062***											
monop	-0.1058***	-0.0150										
age	0.1174***	0.079***	-0.0113									
size	0.0823***	0.2287***	-0.0124	0.2902								
access	0.1258***	0.1699***	-0.054***	0.0457***	0.2508***							
tech	0.1402***	0.1035***	-0.0275***	0.0476***	0.2169***	0.1724***						
exporter	0.0384***	0.1510***	0.0209**	0.0330***	0.2970***	0.1871***	0.0857***					
private	0.1751***	0.1408***	-0.0354***	0.1513***	0.0673***	0.0444***	0.0309***	0.0979***				
legal	-0.1840***	-0.0226**	0.0279**	-0.0887***	-0.1374***	-0.2294***	-0.1759***	-0.0465***	-0.1443***			
gdpcap	0.1419***	0.0967***	-0.0615***	0.0183**	-0.0221***	0.1508***	0.1598***	-0.0852***	0.3405***	-0.0131*		
growth	-0.2419***	-0.031***	0.0699***	-0.1559***	0.0453***	-0.1441***	-0.1356***	-0.0379***	-0.4259***	0.5128***	-0.0975***	
inflation	-0.0484***	-0.0438***	0.1355***	-0.0726***	-0.0542***	-0.0109	0.0266***	-0.0637***	-0.2265***	-0.1056***	0.2018***	0.1890***

Table 4 - Using Trade Credit as a Competitiveness Tool

The dependent variable is the percentage of goods sold on credit. The variable *conspower* gives the percentage of domestic sales sold to multinationals located in the home country and to large domestic firms. *Monop* is a dummy for firms that do not expect to see demand drop after a price increase. *Age* is the log of the age of the firm. *Size* is the log of the number of permanent and temporary employees. *Access* is a dummy for firms that have access to either domestic or foreign sources of external finance. *Export* is a dummy for firms that export at least 25 percent of their sales. *Tech* is a dummy for firms with technically advanced products. *Private* is equal to bank credit extended to the private sector divided by GDP. *Legal*, score 1 to 6, is an indicator of the degree to which citizens of a country are able to utilize the existing legal system to mediate disputes and enforce contracts. *Gdpcap* is the real GDP per capita. *Growth* is the growth rate of the per capita real GDP. *Inflation* is the rate of inflation of the GDP deflator. The regressions are estimated using two-tailed tobit, with standard errors robust for heteroskedasticity. All regressions include sector dummies and regressions (1)-(5) also include country-dummies, however these are omitted from the table due to space considerations. All regressions include a constant. Coefficients are marginal effects. The robust p-values appear in brackets and ***, ** and * correspond to 1 percent, 5 percent and 10 percent level of significance respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Conspower	0.117***	0.266***	0.222***	0.146***	0.118***	0.213***	0.134***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.002]
Monop	-5.057***	-4.495*	-6.146*	-4.443***	-6.118***	-6.385**	-2.377
	[0.000]	[0.065]	[0.059]	[0.001]	[0.000]	[0.024]	[0.613]
*Conspower*Size*		-0.040***					
		[0.000]					
*Monop*Size*		-0.219					
		[0.747]					
*Conspower*Age*			-0.044***				
			[0.004]				
*Monop*Age*			0.478				
			[0.727]				
*Conspower*Access*				-0.054**			
				[0.035]			
*Monop*Access*				-1.664			
				[0.451]			
*Conspower*Tech*					-0.002		
					[0.944]		
*Monop*Tech*					1.825		
					[0.409]		
*Conspower*Private*						-0.347***	
						[0.010]	
*Monop*Private*						-8.112	
						[0.505]	
*Conspower*Legal*							-0.001
							[0.920]
*Monop*Legal*							-1.677
							[0.208]
Age	7.545***	7.259***	7.778***	7.397***	7.553***	10.894***	11.021***
	[0.002]	[0.003]	[0.002]	[0.003]	[0.002]	[0.000]	[0.000]
Agesq	-1.951***	-1.886***	-1.822***	-1.924***	-1.941***	-2.579***	-2.612***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Size	6.847***	6.704***	6.586***	6.772***	6.661***	8.838***	8.817***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Sizesq	-0.670***	-0.547***	-0.637***	-0.662***	-0.656***	-0.939***	-0.938***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Access	5.816***	5.824***	5.802***	7.261***	5.629***	6.469***	6.514***
	[0.000]	[0.000]	0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Export	4.737***	4.910***	4.800***	4.804***	4.777***	0.102*	2.933*
	[0.001]	[0.000]	[0.000]	[0.000]	[0.001]	[0.087]	[0.077]
Tech					1.493		
					[0.131]		
Private						-97.604***	-108.481***
						[0.000]	[0.000]
Legal						-5.562***	-5.349***
						[0.000]	[0.000]
Gdpcap						0.009***	0.009***
						[0.000]	[0.000]
Growth						-1.817***	-1.848***
						[0.000]	[0.000]
Inflation						-0.069**	-0.066*
						[0.046]	[0.053]
LR chi2	4709.915	4769.776	4727.033	4727.590	4715.452	2855.070	2880.320
No. Obs.	8983	8983	8983	8983	8964	6733	6733

Table 5 - Using Trade Credit as a Competitiveness Tool, Robustness Test

The dependent variable is the percentage of goods sold on credit. The variable *conspower* gives the percentage of domestic sales sold to multinationals located in the home country and to large domestic firms. *Age* is the log of the age of the firm. *Size* is the log of the number of permanent and temporary employees. *Access* is a dummy for firms that have access to either domestic or foreign sources of external finance. *Export* is a dummy for firms that export at least 25 percent of their sales. *Tech* is a dummy for firms with technically advanced products. *Private* is equal to bank credit extended to the private sector divided by GDP. *Legal* , score 1 to 6, is an indicator of the degree to which citizens of a country are able to utilize the existing legal system to mediate disputes and enforce contracts. *Gdpcap* is the real GDP per capita. *Growth* is the growth rate of the per capita real GDP. *Inflation* is the rate of inflation of the GDP deflator. The regressions are estimated using two-tailed tobit, with standard errors robust for heteroskedasticity. All regressions include sector dummies and regressions (1) to (5) also include country-dummies, however these are omitted from the table due to space considerations. All regressions include a constant. Coefficients are marginal effects. The robust p-values appear in brackets and ***, ** and * correspond to 1 percent, 5 percent and 10 percent level of significance respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Conspower	0.129***	0.232***	0.213***	0.147***	0.115***	0.231***	0.166***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
*Conspower*Size*		-0.026***					
		[0.000]					
*Conspower*Age*			-0.034***				
			[0.009]				
*Conspower*Access*				-0.037*			
				[0.091]			
*Conspower*Tech*					0.017		
					[0.445]		
*Conspower*Private*						-0.357***	
						[0.004]	
*Conspower*Legal*							-0.006
							[0.595]
Age	5.539**	5.568**	5.931***	5.457**	5.894***	10.036***	10.104***
	[0.013]	[0.012]	[0.007]	[0.014]	[0.009]	[0.000]	[0.000]
Agesq	-1.528***	-1.528***	-1.442***	-1.514***	-1.602***	-2.309***	-2.325***
	[0.000]	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]	[0.000]
Size	6.499***	6.328***	6.302***	6.449***	6.415***	9.963***	9.986***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Sizesq	-0.593***	-0.506***	-0.569***	-0.587***	-0.592***	-0.977***	-0.985***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Access	6.206***	6.180***	6.175***	7.107***	5.953***	6.357***	6.432***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Export	3.283***	3.401***	3.286***	3.367***	3.351***	2.065	2.175
	[0.006]	[0.004]	[0.006]	[0.005]	[0.006]	[0.171]	[0.151]
Tech					1.626*		
					[0.060]		
Private						-55.961***	-64.300***
						[0.000]	[0.000]
Legal						-7.101***	-6.980***
						[0.000]	[0.000]
Gdpcap						0.006***	0.006***
						[0.000]	[0.000]
Growth						-1.513***	-1.521***
						[0.000]	[0.000]
Inflation						-0.079**	-0.075**
						[0.016]	[0.021]
LR chi2	4709.915	4769.776	4727.033	4727.590	4715.452	2855.070	2880.320
No. Obs.	8983	8983	8983	8983	8964	6733	6733

Appendix - Variable Definitions and Sources

Variable	Definition	Source
Soldoncred	Percentage of goods sold on credit.	ICU Investment Climate Survey
Conspower	Percentage of domestic sales sold to multinationals in the firm's home country and to large domestic firms (those with approximately 300 plus workers).	ICU Investment Climate Survey
Monop	Dummy variable that takes on the value one if the firm does not expect to see demand drop after a price increase, zero otherwise.	ICU Investment Climate Survey
Age	Log of the age of the firm	ICU Investment Climate Survey
Size	Log of the number of permanent plus temporary employees.	ICU Investment Climate Survey
Access	Dummy variable that takes on the value one if the firm has a relationship with a domestic and/or a foreign owned commercial bank, if a share of the firm's borrowing is in foreign currency, if a foreign company is the largest shareholder or owner, or if the firm has holdings or operations in other countries, zero otherwise.	ICU Investment Climate Survey
Tech	Dummy variable that takes on the value one if the firm developed a new product line and/or developed a new technique that substantially changed the way the main product is produced in the last three years and/or received ISO certification, zero otherwise.	ICU Investment Climate Survey
Export	Dummy variable that takes on the value one if the firm exports at least 25 percent of its products directly (exports through a distributor are not taken into account), zero otherwise.	ICU Investment Climate Survey
Private	Credit extended by deposit money banks to the private sector divided by GDP, based on the year that coincides with the year of the survey questions.	International Financial Statistics
Legal	Measure of law and order tradition in the country, scored 1 to 6. Low scores indicate a tradition of depending on physical force and illegal means to settle claims. High scores indicate sound political institutions and a strong court system, based on the year that coincides with the year of the survey questions.	International Country Risk Guide
Gdpcap	Real per capita GDP, based on the year that coincides with the year of the survey questions.	World Development Indicators
Growth	Growth rate of real per capita GDP, based on the year that coincides with the year of the survey questions.	World Development Indicators
Inflation	Inflation rate of the GDP deflator, based on the year that coincides with the year of the survey questions.	World Development Indicators