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Customer Market Power and the Provision of Trade Credit; Evidence from Eastern Europe and Central Asia

Neeltje Van Horen

The World Bank, University of Amsterdam

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Abstract

Statistics show that the sale of goods on credit is widespread among firms even when they are capital constrained and thus face relatively high costs in providing trade credit. This study provides an explanation for this by arguing that customers that possess strong market power are able to increase their customer surplus by demanding to purchase the goods on credit. This gain in customer surplus increases with the degree of asymmetric information between buyer and seller with respect to product quality. Therefore, firms that are perceived as risky are especially subject to the market power of the customer and have to sell their goods on credit. Using detailed firm-level data from a large number of firms in Eastern Europe and Central Asia, this paper finds evidence consistent with this hypothesis. We find a strong positive correlation between customer market power and trade credit provision. Furthermore, this relationship is especially strong when the supplier is more risky and in countries with limited financial sector development or weak legal system.

JEL Classification Codes: L10, L14

1. Introduction

Trade credit is created whenever a supplier offers terms that allow the buyer to delay payment. Evidence shows that trade credit is an integral part of doing business for a large number of firms.[1] Petersen and Rajan (1997) and Atanasova and Wilson (2003) show respectively that 70 percent of small U.S. firms and 80 percent of firms in the U.K provide credit to their customers. A yearly survey of the Mexican Central Bank shows that in 2006 on average about 72 percent of Mexican firms provided trade credit to their suppliers. A striking feature of the Mexican data that small firms are more likely to provide trade credit than larger firms. This contrasts with the situation in the U.S. where small firms typically provide less trade credit (see Petersen and Rajan 1997). Since, particularly in developing countries, small and medium enterprises are often more capital constrained than large firms (Demirguc-Kunt and Maksimovic 2005), these results raise the question why, especially in developing countries, small firms sell a relative large amount of their goods on credit.

This study provides an explanation for this by showing that the provision of trade credit can increase customer surplus, especially when uncertainty with respect to the quality of a desired product is large. As buyer-seller relationships are characterized by asymmetric information regarding product quality, a customer, if he cannot insure himself against product malfunctioning, will discount the value he expects to gain from the purchase with the risk he faces that the quality is worse than agreed upon. So, the more risky the exchange, the lower the expected value of the purchase will be. This provides the customer with an incentive to demand to buy the good on credit, as this allows the buyer to verify product quality before paying, thereby limiting the risk he faces (Smith 1987; Long, Malitz and Ravid 1999; Ng, Smith and Smith 1999; Pike, Cheng, Cravens and Lamminmaki 2005). In other words, buying goods on credit raises the customer's surplus, especially when dealing with suppliers that are more risky.

However, providing trade credit is (in most cases) costly to the supplier as it diverts money away from his working capital. Furthermore, it can create a moral hazard

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[1] Several theories have been developed to explain why firms provide trade credit. See, for example, Mian and Smith (1992), Smith (1995) and Petersen and Rajan (1997) for an overview.

problem for the supplier with respect to customer creditworthiness. This provides the supplier with an incentive to favor customers that do not demand trade credit or ones for who the cost of providing it is relatively low (for example, customers whose creditworthiness has been established through numerous previous trades). However, if a supplier faces a customer with strong market power, it will be difficult to find an alternative buyer for his goods. In this case, the supplier will have no choice but to give in to a customer's demand for trade credit if he want to make a sale. In other words, suppliers that have customers with strong market power will on average sell more goods on credit. As the gain in customer surplus is especially large when the exchange relationship is perceived as more risky, customers will especially exert their market power and buy goods on credit when a supplier firm is small and located in a less developed country. This explains why these firms, even if they are capital constrained, are providing more trade credit to their clients.

Using detailed firm level data of firms from 20 countries in Eastern Europe and Central Asia, this paper tests for the impact of customer market power on the use of trade credit. It finds a strong positive relationship between customer market power and trade credit provision. This relationship is especially strong when the supplier is more risky and in countries with limited institutional development. These results suggest that customers indeed use their market power to buy goods on credit as a way to increase their customer surplus.

This paper is related to several strands of literature. First, the paper builds on and extends earlier work that tries to explain why trade credit is so prevalent amongst firms (see, for example, Petersen and Rajan 1997). Specifically, it builds on the work done on relational contracting (most notably, McMillan and Woodruff 1999 and Fisman and Raturi 2004). Although in this context, the impact of monopoly supplier power on the provision of trade credit has been studied, very little empirical evidence exists on the impact of customer market power on the provision of trade credit. The few studies that explicitly examine it (Banjeree, Dasgupta and Kim 2004; Wilson and Summers 2002) focus exclusively on U.S. firms. Furthermore, the fact that Banjeree et al. (2004) studying large manufacturing firms find that trade credit and customer market power are negatively related, while Wilson and Summers (2002), studying small firms, find a positive

relationship, suggest that the presence of customer market power affects different suppliers differently. However, the influence of firm characteristics has rarely been taken into account in these studies. Second, the paper adds to the literature that tries to explain how asymmetric information is dealt with in buyer-seller relationships. Most notably, it builds on the work of Ng et al. (1999) and Pike et al. (2005) who study the impact of asymmetric information on the terms of trade credit provision. Third, it adds to the literature that examines how the institutional environment of developing countries impacts firm's business strategies, as in the work of Demirguc-Kunt and Marksimovic (1998).

The rest of this paper is organized as follows. In Section 2, we provide a theoretical overview of how customer market power affects the provision of trade credit by a supplier. In Section 3 we describe the data and in Section 4 the empirical methodology. The results are described in Section 5. The last section concludes.

2. Theoretical overview

In an exchange relationship between buyer and seller, the seller typically knows more about product quality than the buyer does. This exposes the customer to a moral hazard problem if he is paying cash for the product, as assessing the true quality of the product beforehand will not be possible. As such, a rational customer, when determining the expected value he expects to get from purchasing the product ($E(V_c)$), will take into account the possibility that the product is of lower quality than expected. In other words, the expected value of the purchase (and hence, the maximum price a customer is willing to pay for the product) can be represented by the following equation:

$$E(V_c) = \pi(Qe_c) + (1-\pi)(Qw_c) \qquad (1)$$

Where Qe_c equals the monetary value the customer has assigned to the product if that product has the expected quality, while Qw_c reflects the monetary value of the product if the quality is lower than expected, with $Qe_c > Qw_c$, and π equals the probability the

product is of the correct quality. So, the higher the uncertainty about product quality the lower the price the consumer is willing to pay for the product.

Assume that the supplier is a price taker in a competitive market, with price $P_s = P$. The consumer surplus for each individual customer will then be equal to $E(V_c) - P$, which, from equation (1), implies that the customer's surplus is directly affected by the uncertainty surrounding the actual product quality. Reducing the asymmetric information between buyer and seller regarding the quality of the product will increase the probability that the product is of the expected quality and, as such, the surplus the customer obtains from buying the product.

Risks regarding product quality can be reduced by establishing a long-term relationship between buyer and seller so that reputation is built, or by the seller providing guarantees. Another way to lessen the risk is the use of trade credit, as it allows the buyer to verify product quality before paying, thereby reducing the asymmetric information problems (Smith 1987; Long et al. 1999; Ng et al. 1999; Pike et al. 2005). When the product is sold on credit the above equation is replaced by:[2]

$$E(V_c) = Qe_c \qquad (2)$$

Since the supplier is a price taker, providing trade credit to the customer will not affect the price (P) the customer has to pay. So, trade credit increases the customer's surplus, providing the customer with an incentive to demand it. This incentive will be especially strong when asymmetric information regarding product quality is high.

However, selling a product on credit generates costs for the supplier. First, it lowers funds available for working capital needs, which can be especially problematic for firms that are capital constrained. Second, it introduces a moral hazard problem for the supplier as the willingness of a supplier to sell goods on credit might attract buyers that

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[2] Note that buying goods on credit can generate costs for the customer (TCc_c), for example due to the significant late payment penalties involved (see Petersen and Rajan 1994). However, as long as $TCc_c < (1-\pi)Qe_c - (1-\pi)Qw_c$ the increase in expected value due to elimination of product quality uncertainty will exceed the costs generated by buying the product on credit and the customer will be better off buying on credit. If the opposite holds, the customer will prefer to pay cash. For the sake of brevity, but without losing the generality of the argument made, we will assume that abovementioned condition holds.

are poor credit risk and have no alternative sources of credit. At the same time selling goods on credit also has benefits. For example, if the supplier trades frequently with the same customer, selling goods on credit lessens the total transaction costs of the sales (see Ferris 1981). Since the supplier is a price taker he has no means to adjust the sales price when he sells his product on credit. But, the expected value he assigns to the sale ($E(V_s)$) will incorporate the costs he makes and the benefits he receives from providing trade credit (TC_s). So,

$$E(V_s) = P - TC_s \qquad (3)$$

where $TC_s = TCc_s - TCb_s$ and TCc_s reflects the costs to the supplier of providing trade credit and TCb_s the benefits. The value of TCc_s will be different for different suppliers and is also affected by the type of customer. For example, the cost of providing trade credit is relative low for a firm that has no problem to access commercial credit and whose customer is a AAA firm he has been trading with for a long time. If the supplier trades frequently with this customer, the benefits of providing trade credit will very likely outweigh the costs ($TC_s < 0$). In this case $E(V_s)$ will be higher when trade credit is provided than when the customer pays cash, and the supplier's surplus ($E(V_s) - P$)) increases by providing trade credit. However, for many suppliers, especially smaller firms that are capital constrained, the cost of trade credit will exceed the benefits, so providing trade credit will lower the expected value of the sale for the supplier. However, as long as the production costs do not exceed the expected value of the sale ($(E(V_s) > C_s)$), the firm would be better off making the sale even when a customer refuses to pay cash.

In a market with many buyers, the supplier has a choice between customers, and will choose in such a way that his producer surplus is maximized. From equation (3) this implies that a supplier will have a preference to engage in sales for which $TC_s < 0$. If no exchanges are possible for which $TC_s < 0$ the supplier will prefer to have sales paid in cash. When (part of the) potential customers, however, demand trade credit, and even though $TC_s > 0$ for each of those customer, he will sell to the customer for whom TC_s

has the lowest value (as long as $E(V_s) \geq TC_s$). For example, the supplier will have a preference to sell to a customer that is more creditworthy. The customer, realizing that the supplier has alternative customers he can choose from, will take into account the fact that demanding trade credit might make it impossible from him to buy the product from that supplier, when deciding to demand to buy goods on credit. As a result in a competitive market, suppliers that have no problem raising capital (i.e., firms for whom selling goods on credit is relative cheap) will more likely provide trade credit, while creditworthy customers are more likely to receive credit.

However, when instead of multiple customers the market consists of only one, no alternative customer will be available to the supplier. In this case, not selling the good to the customer will imply that the supplier will not earn anything. In this case, if the customer demands trade credit (which he will do as long as $TCc_c < (1-\pi)Qe_c - (1-\pi)Qw_c$) the supplier will sell the goods on credit, unless his production costs exceed $E(V_s)$. As the benefit of buying goods on credit for the customer is particularly large when doing business with a supplier who is perceived as risky, especially risky suppliers are expected to sell goods on credit when the customer has market power.

The analysis above suggests that due to the positive impact of trade credit on customer surplus, ceteris paribus, (1) customers that have market power will receive more trade credit than customers that do not have market power, and (2) customers with market power will exert their power to buy goods on credit especially when the exchange with the supplier is more risky. In the next section we test empirically whether this is indeed the case.

3. Data

The data used in this paper come from the EBRD-World Bank Business Environment and Enterprises Performance Survey (BEEPS), developed jointly by the World Bank and the European Bank for Reconstruction and Development. This is a survey conducted in order to asses the quality of the business environment of the countries of Central and Eastern Europe and the former Soviet Union. It is a survey of managers and owners of a large

number of firms and it provides comparative measurements of the investment climate, quality of governance and the competitive environment, which can then be related to different characteristics of the firm and to firm performance. The main focus of the survey is on microeconomic and structural dimensions of a country's business environment, viewed in an international process.

In each country the BEEPS asks 200-600 firms questions about their business environment and their interactions with the state. The samples are chosen in a uniform way in each country, with sector composition divided according to contribution to GDP. Firms that operate in sectors subject to government price regulation and prudential supervision, such as banking, electric power, rail transport, and water and waste water were not included. The sample includes quotas with respect to certain firm criteria (size, ownership, exporter, location and age) to ensure sufficient numbers of firms to conduct analysis on firms with certain characteristics. Furthermore, enterprises with only 1 employee or more than 10,000 employees were excluded, as were enterprises that only began operations in the three years prior to the survey.

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. The survey has been carried out in three rounds: 1999, 2002 and 2005, however, in this study we will only use the data from the 2002 survey as the variable that provides a good proxy for customer market power is only included in this questionnaire.

The survey is conducted in 27 countries, however, seven countries (Bosnia and Herzegovina, Georgia, Kyrgyzstan, Macedonia, FYR, Tajikistan, Serbia and Montenegro, and Uzbekistan) are excluded from the sample as some explanatory variables are not available for these countries. After excluding firms that sell 75 percent or more of their sales to their parent companies or their own subsidiaries, our sample includes 5,164 firms. Table 1 shows the number of firms in each country with information on the provision of trade credit.

This database is unique for a number of reasons. First, it provides information for a large group of developing countries that differ substantially in their economic development, which allows us to test the impact of cross-country differences on the

provision of trade credit. 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 customers the surveyed firm is doing business with. This has the major advantage that information about market power of customers can be derived directly from the survey and thus does not have to be proxied for example by looking at industry concentration levels.

4. Hypothesis formulation and empirical strategy

In this section we test formally whether customers exert market power to buy their goods on credit in order to raise their customer surplus by lessening asymmetric information problems regarding product quality. This is summarized in the following hypothesis:

Hypothesis: Suppliers that sell goods to customers with strong market power will extend more trade credit. The higher the risk in the exchange relationship the more pressure customers will put on their suppliers extend trade credit.

In order to test this hypothesis we use a cross-sectional regression analysis. The survey provides a useful measure of provision of trade credit, as the respondents were asked what percent of the firm's sales were sold on credit. This gives us a dependent variable (*soldoncred*), which shows variability beyond the yes and no distinction of a dummy variable often used in this type of studies.

Ideally, one would like to measure customer market power in the exchange relationship by determining the sales concentration ratio. Unfortunately, the survey does not provide this exact number. However, it contains a variable that indicates whether less or more than 20 percent of the sales go to the three largest customers of the firm. Therefore, our variable capturing consumer market power (*custpower*) is a dummy which is one if the firm sells at least 20 percent of its sales to its three largest customers and zero otherwise. A positive and significant sign for *custpower* indicates that customer market power raises the percentage of goods sold on credit, and as such provides evidence in favor of our hypothesis.

The increase in customer surplus will be especially high when asymmetric information regarding product quality is large. Therefore, we expect the impact of customer market power to be especially large when suppliers are firms whose product quality is harder to determine. It is often argued that small and young firms are informationally opaque, especially in developing countries, increasing the magnitude of asymmetric information problems between buyer and seller. Therefore, if our hypothesis is correct we should find that customers with strong bargaining power exert their power more when they buy goods from these firms. In other words, a significant and negative interaction between *custpower* and size and age of the firm provides evidence in favor of our hypothesis.

Firms that lack access to finance often also lack a strong reputation. In addition, lack of access to finance implies that providing trade credit is relatively expensive, so one would expect these firms to be less willing to sell goods on credit. Indeed several studies have found that the provision of trade credit and access to finance are positively correlated (see, for example, Petersen and Rajan 1997). As such, a significant and negative relationship between the percentage of goods sold on credit and an interaction between *custpower* and a firm's access to finance, is also evidence in favor of our hypothesis.

Finally, the need for quality insurance is higher when the goods sold are heterogeneous as opposed to homogeneous. For example, Long et al. (1993) find that firms producing products whose quality requires longer to assess are more likely to extend trade credit relative to sales. Therefore, if customers exert their market power in order to limit asymmetric information problems and so increase their customer surplus, we would expect the interaction between customer market power and the technical complexity of the product sold to be positive.

Besides firm characteristics, also certain country characteristics, like the development of the financial and legal system, can have an impact on the extent or cost of asymmetric information between buyer and seller and as such affect the risks faced by the customer. 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, reducing asymmetric information problems between buyer and seller. Therefore,

a negative relationship between the interaction of *custpower* and the development of the domestic financial system provides evidence in favor of our hypothesis.

When a country's legal system is not well developed the costs associated with asymmetric information regarding product quality will be larger as firms have less legal recourse. As a result, if customers exert their market power to lessen asymmetric information problems, they will do more so in a country where the rule of law is weak. This suggests that the relationship between the interaction of *custpower* and the development of the legal system should be negative.

The variables used in the various interaction terms are measured as follows: the variable *size* equals the log of the number of permanent plus temporary employees and the variable *age* equals the log of the age of the firm. To determine whether the firm has access to sources of finance we use a hypothetical question in the survey that asks how easy it would be for the firm to obtain a short-term working capital loan on commercial terms. Based on the answers to this question we construct a dummy variable, *access*, which is zero if the firm answered the question with 'impossible' or very 'difficult' and one if it answered 'fairly difficult', 'fairly easy' or 'very easy'. The variable that captures whether the firm makes higher-tech products, *tech,* is a dummy which is 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, and zero otherwise.

The development of the domestic financial sector, *private*, is measured by the ratio of the claims on the private sector by deposit money banks to GDP. This variable has been used in previous studies examining the impact of differences in financial development across countries (see, for example, Rajan and Zingales 1998 and Demirguc-Kunt and Maksimovic 2002). To measure the development of the legal system we use a commercial index of expert's evaluations of the efficiency of the state in enforcing property rights within each country produced by the International Country Risk Rating agency. 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 many previous studies comparing institutions in different countries (see, for example, Knack and Keefer 1995 and Demirguc-Kunt and Maksimovic 2002).

Table 2 contains the sample statistics of the variables we consider. In addition to the variables discussed above, we also control for some potential firm-specific and country-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, as we expect that 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 a control variable to account for the fact that firms with access to external finance potentially pass on funds to financially less secure firms. The variable *tech* is also added as a control variable, as firms that produce goods that are technically more advanced are more likely to provide trade credit.

The export content of the firm's sales can potentially impact the percentage of goods sold on credit (see for example Ng et al. 1999), and as such should be controlled for. The relationship can be positive reflecting the fact that a buyer will likely demand more credit as international trade is more risky or the fact that international customers are potentially more creditworthy, lessening the risk from the supplier's side. Or it can be negative, as from the seller's perspective international trade intensifies information problems. As to control for the impact of export, 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). A final firm characteristic for which we control is the monopoly power of the supplier. Theoretically, the impact of monopoly power on the provision of trade credit can either be positive (see Petersen and Rajan 1995 and McMillan and Woodruff 1999), or negative (as argued by Fisman and Raturi 2004). To control for the impact of monopoly power, we include the variable *monop*. This is a dummy variable that takes on the value one if the firm faces less than 4 competitors in the domestic market and expects that demand would not be affected by a price increase of 10 percent and zero otherwise.

In addition we included several variables to control for country effects. We control for development of the financial sector and the legal system by including the variables *private* and *legal*. As argued by Demirguc-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, indicating that the correlation could run both ways. In addition, the development of the legal system and the usage of trade credit are expected to be negatively correlated. Efficiency of a legal system is more important for financial intermediaries than for suppliers in their risk exposure, as 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.

Following Demirguc-Kunt and Maksimovic (2002), we also 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 real GDP per capita (*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. Finally, to correct for the possibility that the provision of trade credit varies systematically by sector, sector dummies are included: manufacturing, mining, construction, transportation, wholesale and retail, real estate, tourism and other firms.

Our model is as follows:

$$
\begin{aligned}
Soldoncred_{ic} = \alpha_0 &+ \alpha_1 Conspower_{ic} + \alpha_2' Conspower_{ic} * Risk_{ic} \\
&+ \beta_1' F_{ic} + \gamma_1' X_c + \delta_1' S_{ic} + \varepsilon_{ic}
\end{aligned}
\tag{1}
$$

where *i* refers to the individual firm and *c* to the country in which the firm is located. $Risk_{ic}$ is a vector of firm and country characteristics that impact the risk associated with the exchange for the customer with respect to product quality. the existence of asymmetric information between buyer and seller. These include firm size, firm age, access of firm to formal credit and institutional development of the country in which the

firm is located. F_{ic} is a vector of firm characteristics, including size, age, access to formal credit, export activities and monopoly power. X_c is a vector of country characteristics, including development of financial sector and legal system, real GDP per capita, growth rate of real GDP per capita and inflation. S_{ic} is a vector of sector dummies. As our dependent variable shows a concentration around zero and 100 percent OLS regression is not appropriate. Therefore, we use as our regression model a standard Tobit model with two-sided censoring.[3] In addition, the standard errors are corrected for heteroskedasticity.

Table 3 shows the correlation matrix for the variables in our study. The fact that customer market power is associated with more trade credit provides some preliminary evidence in favor of our hypothesis. In the next section we will test this more formally.

5. Results

5.1 Impact of customer market power

The main focus of this paper is to test whether customers exert their market power to buy their goods on credit in order to lessen asymmetric information problems concerning product quality. Table 4 presents the 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).

The first column in table 4 indicates that there indeed exists a positive relationship between customer bargaining power and the provision of trade credit. This provides a first indication that customers use their market power to buy more goods on credit in order to extract surplus. However, the result could also reflect the fact that suppliers are more willing to provide more trade credit to customers with strong market power because they are more creditworthy firms. As pointed out by Petersen and Rajan (1997), buyer reputation and credit rating can reduce concerns about non-payment and as such facilitate the provision of trade credit. Although we do not know the characteristics of the three largest customers, we do know that a negative correlation exists between our variable

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

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measuring customer market power and the percentage of total sales sold to small firms and individuals. So, firms with strong market power are often more creditworthy firms.

The subsequent columns in table 4, however, provide further support to the idea that customers indeed use trade credit to extract customer surplus. In all cases, except one, the interaction terms show the expected results, indicating that customers especially use their market power when doing business with the supplier is risky. When asymmetric information between buyer and seller is relatively large because the firm is small, young or has no access to commercial lines of credit, the impact of customer bargaining power on the amount of goods sold on credit is significantly larger. For example, the impact of customer bargaining power on the goods sold on credit more than doubles when the firm is financially constrained. Furthermore, in countries where asymmetric information problems are more severe due to an underdeveloped financial sector or weak rule of law, customers will exert more of their market power so they can buy their goods on credit. For example, keeping everything else constant, in a country with the strongest rule of law (for example Croatia) the difference between the amount of goods sold on credit between firms with and firms without customers with bargaining power is only 1 percent. However, in a country with the weakest rule of law (Albania) suppliers with customers with strong bargaining power sell 12 percent more goods on credit. This difference is economically very relevant considering that the mean percentage of goods sold on credit is 28 percent.

Only in one case do the results not support our hypothesis. A possible explanation for the insignificant, instead of the expected significant negative, interaction between *custpower* and *tech,* could be the fact that companies that produce technically more advanced products are in general larger companies, limiting asymmetric information problems. Furthermore, 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 longer terms of credit as to allow the customers a longer time to test the quality of the product (Long et al. 1993). Unfortunately we have no information on the terms of trade credit, thus testing for this is not possible.

The coefficients of the control variables are mostly as expected. Firm size, a proxy for the reliability and reputation of a company, is large and significant. With the significance of the squared term indicating that the relationship is non-linear. However, the coefficient for *age* is negative. This unexpected outcome might be the result of the relative high correlation between *age* and *size*. The coefficient on *access* is also positive and highly significant. This finding is consistent with the results found by for example Petersen and Rajan (1997), and indicates that a firm with access to commercial credit sells more goods on credit than a firm without this access. The positive sign of *export*, significant at the one percent level, 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 et al. (1999). Like Fisman and Raturi (2003) we find that an increase in monopoly power lessens the provision of trade credit.

Country-level control variables (except *private*) are coherent over all specifications. Consistent with the results found by Demirguc-Kunt and Maksimovic, we find a positive relationship between the development of the financial system and the provision of trade credit and a negative relationship between the development of the legal system and the provision of trade credit. Furthermore, our results suggests that there exists a negative relationship between the use of trade credit and the economic development of the country, and a positive one between trade credit provision and inflation.

Our results provide evidence that customers exert their market power in order to extract more customer surplus by reducing the risks they face with respect to product quality. In addition, they can explain the seemingly contradictory results of Banjeree, et al. (2004), who find a negative relationship between customer market power and provision of trade credit, and Wilson and Summers (2002), who find a positive relationship.

Wilson and Summers (2002), study the impact of customer market power on the provision of trade credit by small U.S. firms. Consistent with our results, they find that small firms are strongly affected by customer market power, and tend to provide more

trade credit to those customers. Banjeree et al. (2004) study the impact of customer market power on trade credit decisions of large firms in a well-developed economy. The negative correlation they find is also consistent with our results. Our findings indicate that customers will especially exert their market power to buy goods on credit when firms are small and in countries where institutional development is still in its early stages. In fact, if we add to the regression a variable interacting *custpower* with real GDP per capita (last column in table 4) we find a significant and negative marginal effect. Moreover, the result shows that, holding all other factors constant, if real GDP per capita exceeds US$ 7,262 (in our sample only in Slovenia) the relationship between customer bargaining power and trade credit becomes negative. In other words, when customers are doing business in a well-developed economy dealing with large suppliers (i.e. the uncertainty regarding product quality is very limited), the surplus gained from buying goods on credit is insignificant and possibly negative. This can explain the negative correlation found by Banjeree et al. (2004).

5.2 Sensitivity analysis

The variable that we use to measure customer market power has some disadvantages. First, it is a discrete and not a continuous variable. Second, information on the characteristics of the firm's three largest customers is not available. This implies that the variable attaches as much market power to three largest customers when they are small firms as it does to three largest customers when they are multinationals. Both factors prevent the variable to measure the exact level of market power of the firm's customers.

Even though the survey does not provide us with a more accurate measure of customer market power, it does allow us to do a sensitivity analysis using a variable that captures customer market power in a different way. In general large customers will have more market power than their smaller counterparts, especially when they buy inputs from small enterprises. So the size of customers can be used as a measure of customer market power. As such, our alternative measure of customer market power, *custpower2* , 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).

The results of the sensitivity analysis can be found in table 5. They indicate that our earlier findings are robust to an alternative measurement of customer market power. Again we find a positive and highly significant correlation between customer market power and the provision of trade credit, and this relationship is strengthened when the firm is small or young or when institutional development (as measured by financial sector development and the development of the legal system) is weak.

In addition to testing the robustness of our results to an alternative way of measuring customer market power, we also did some other sensitivity tests (not reported, but available from the author upon request). First, we estimated the model with a less strict variable for monopoly power: a dummy that is one if the firm has less than four competitors and expects demand to be slightly or not affected by a 10 percent price increase. Second, we replaced the variable *access* with one that is more stringent, identifying a firm as having access to finance only if short-term working capital can be obtained fairly or very easy. Third, we used a different variable capturing the development of the legal system using the rule of law variable identified by Kaufmann et al (2005). Our results were not sensitive to any of these changes.

Summarizing, we find robust evidence that customers indeed use their market power to pressure suppliers into selling goods on credit in order to increase their customer surplus by reducing the risks they face regarding product quality.

6. Conclusion

The use of trade credit by firms in both developed and developing countries is widespread, even when these firms are capital constrained and face relative high costs when providing trade credit. Evidence also indicates that in developing countries small firms provide more trade credit relative to large firms, while in developed countries the opposite is the case. This study provides an explanation for this by arguing that customers that possess strong market power will be able to increase their customer surplus by demanding to buy goods on credit. This gain in customer surplus increases with the degree of asymmetric information between buyer and seller with respect to product quality. As such, especially firms that are perceived as risky are subject to the market power of the customer and have to sell their goods on credit.

Using data from 5,164 firms, mostly small and medium enterprises, in 20 countries in Eastern Europe and Central Asia, we find strong evidence indicating that buyers use their market power to lessen uncertainty about the quality of the product purchased. We find a positive relationship between customer market power and the percentage of goods sold on credit and this relationship is stronger when the asymmetric information problems between buyer and seller are larger, either because doing business with the firm is more risky or because the business environment is less developed.

The results of this study show that the provision of trade credit can increase customer surplus and as such can have a positive impact on the demand for a firm's products. As such, the willingness of a firm to sell his goods on credit can have a substantial positive impact on its sales. However, for many firms (especially the more risky ones) it is often expensive to sell goods on credit as they are financially constrained so late payments can have large costs. Developing country governments could potentially lessen these negative side-effects by supporting the establishment of factoring companies. By making use of a factoring company, firms can sell their accounts receivable or invoices and the factor will collect the debt. This way the seller can immediately receive a percentage of the face value of the receivables, which speeds up the cash flow and limits the disruptive effect the provision of trade credit can have on firm growth.

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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	128	Estonia	165	Romania	253
Armenia	162	Hungary	246	Russia	477
Azerbaijan	152	Kazakhstan	245	Slovakia	161
Belarus	249	Latvia	175	Slovenia	174
Bulgaria	245	Lithuania	200	Turkey	511
Croatia	182	Moldova	172	Ukraine	461
Czech Republic	250	Poland	494		

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	5,102	28.24	10.00	35.01
Asymmetic information variables				
Custpower	5,037	0.53	1.00	0.50
Size	5,087	3.29	3.00	1.70
Age	5,102	2.38	2.30	0.74
Access	4,626	0.61	1.00	0.49
Tech	5,088	0.50	1.00	0.50
Private	5,102	21.38	17.70	10.45
Legal	5,102	4.01	4.00	0.64
Control variables				
Export	5,086	0.14	0.00	0.35
Monop	4,965	0.05	0.00	0.22
Gdpcap	5,102	3273.41	2947.00	2344.63
Growth	5,102	5.67	5.70	2.57
Inflation	5,102	12.11	5.10	14.26

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	custpower	size	age	access	tech	private	legal	export	monop	gdpcap	growth
custpower	0.1313 ***											
size	0.1168 ***	0.1551 ***										
age	0.0004	0.0549 ***	0.3846 ***									
access	0.0431 ***	0.0318 **	0.1344 ***	0.0110								
tech	0.0704 ***	0.1239 ***	0.2554 ***	0.0631 ***	0.0513 ***							
private	-0.0765 ***	0.0625 ***	-0.0551 ***	0.1035 ***	0.1198 ***	0.0238 *						
legal	-0.0422 ***	-0.0216	-0.0310 **	0.0509 ***	0.0627 ***	0.0088	0.5421 ***					
export	0.1169 ***	0.1911 ***	0.2708 ***	0.0975 ***	0.0502 ***	0.1192 ***	0.0373 ***	0.0634 ***				
monop	-0.0277 *	0.0722 ***	0.0680 ***	0.0428 ***	0.0202	0.0426 ***	-0.0300 **	-0.0249 *	0.0317 **			
gdpcap	-0.0489 ***	0.0770 ***	-0.0599 ***	0.1004 ***	0.1434 ***	-0.0160	0.7665 ***	0.3935 ***	0.0496 ***	-0.0069		
growth	0.0091	-0.0510 ***	0.0469 ***	-0.0876 ***	-0.0900 ***	-0.0497 ***	-0.5249 ***	-0.1438 ***	-0.0272 *	0.0357 **	-0.5849 ***	
inflation	0.1249 ***	-0.0604 ***	0.0318 **	0.0092	-0.0115	-0.0929 ***	-0.3474 ***	-0.1180 ***	0.0140	0.0371 ***	-0.1340 ***	0.1046

Table 4 - Customer market power and trade credit

The dependent variable is the percentage of goods sold on credit. The variable *custpower* is a dummy variable that takes the value one if more than 20 percent of the firm's sales go to its three largest customers, zero otherwise. *Size* is the log of the number of permanent and temporary employees. *Age* is the log of the age of the firm. *Access* is a dummy variable that is zero if the firm expects that it is impossible or very difficult to obtain a short-term working capital loan on commercial terms, and takes the value one if the firm expects this to be faily difficult, fairly easy or very easy. *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 real GDP per capita. *Export* is a dummy for firms that export at least 25 percent of their sales. Monop is a dummy variable that is one if the firm has less than four competitors in the domestic market and expects that demand would not be affected by a price increase of 10 percent, zero otherwise. *Growth* is the growth rate of the per capital 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 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)	(8)
Custpower	5.35095 ***	11.303 ***	16.088 ***	7.810 ***	6.460 ***	10.892 ***	20.499 ***	9.436 ***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Custpower*Size		-1.820 ***						
		[0.002]						
Custpower*Age			-4.579 ***					
			[0.000]					
Custpower*Access				-3.947 **				
				[0.040]				
Custpower*Tech					-2.187			
					[0.254]			
Custpower*Private						-0.267 ***		
						[0.005]		
Custpower*Legal							-3.887 ***	
							[0.006]	
Custpower*Gdpcap								-0.001 ***
								[0.002]
Size	6.12407 ***	6.658 ***	5.815 ***	6.056 ***	6.076 ***	6.067 ***	6.047 ***	6.092 ***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Sizesq	-0.605 ***	-0.553 ***	-0.565 ***	-0.599 ***	-0.600 ***	-0.602 ***	-0.599 ***	-0.604 ***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Age	-1.83938 *	-1.788 *	0.701	-1.822 *	-1.815 *	-1.846 *	-1.776 *	-1.876 **
	[0.052]	[0.058]	[0.547]	[0.054]	[0.054]	[0.051]	[0.060]	[0.048]
Agesq	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	[0.672]	[0.704]	[0.753]	[0.649]	[0.671]	[0.672]	[0.654]	[0.688]
Access	2.360 **	2.256 **	2.299 **	4.460 ***	2.324 **	2.236 **	2.323 **	2.273 **
	[0.017]	[0.023]	[0.020]	[0.001]	[0.019]	[0.024]	[0.019]	[0.022]
Tech	2.331 **	2.300 **	2.416 **	2.297 **	3.502 **	2.386 **	2.407 **	2.393 **
	[0.023]	[0.025]	[0.019]	[0.025]	[0.012]	[0.020]	[0.019]	[0.020]
Export	5.614 ***	5.960 ***	5.607 ***	5.595 ***	5.673 ***	5.670 ***	5.742 ***	5.685 ***
	[0.001]	[0.000]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Monop	-7.236 ***	-7.055 ***	-7.155 ***	-7.174 ***	-7.211 ***	-7.458 ***	-7.262 ***	-7.481 ***
	[0.001]	[0.002]	[0.002]	[0.002]	[0.002]	[0.001]	[0.001]	[0.001]
Private	0.081	0.074	0.071	0.076	0.080	0.230 **	0.082	0.067
	[0.389]	[0.433]	[0.452]	[0.417]	[0.397]	[0.027]	[0.384]	[0.479]
Legal	-1.712 *	-1.728 *	-1.613 *	-1.704 *	-1.697 *	-1.728 *	0.264	-1.610 *
	[0.059]	[0.056]	[0.075]	[0.060]	[0.061]	[0.056]	[0.817]	[0.076]
Gdpcap	-0.001 **	-0.001 **	-0.001 **	-0.001 **	-0.001 **	-0.001 **	-0.001 **	0.000
	[0.016]	[0.016]	[0.019]	[0.019]	[0.016]	[0.026]	[0.030]	[0.938]
Growth	-0.383	-0.372	-0.364	-0.364	-0.386	-0.342	-0.336	-0.330
	[0.104]	[0.115]	[0.123]	[0.123]	[0.102]	[0.149]	[0.156]	[0.163]
Inflation	0.308 ***	0.307 ***	0.304 ***	0.310 ***	0.308 ***	0.312 ***	0.310 ***	0.308 ***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
LR chi2	484.85	498.37	494.49	493.03	485.89	493.76	495.32	494.95
No. obs.	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,440

Table 5 - Sensitivity analysis

The dependent variable is the percentage of goods sold on credit. The variable *conspower2* gives the percentage of domestic sales sold to multinationals located in the home country and to large domestic firms. *Size* is the log of the number of permanent and temporary employees. *Age* is the log of the age of the firm. *Access* is a dummy variable that is zero if the firm expects that it is impossible or very difficult to obtain a short-term working capital loan on commercial terms, and takes the value one if the firm expects this to be faily difficult, fairly easy or very easy. *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. *Export* is a dummy for firms that export at least 25 percent of their sales. *Monop* is a dummy variable that is one if the firm has less than four competitors in the domestic market and expects that demand would not be affected by a price increase of 10 percent, zero otherwise. *Gdpcap* is real GDP per capita. *Growth* is the growth rate of the per capital 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 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)
Custpower2	0.146 ***	0.139 ***	0.137 ***	0.140 ***	0.141 ***	0.139 ***	0.134 ***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Custpower2*Size		0.513 ***					
		[0.000]					
Custpower2*Age			0.985 **				
			[0.012]				
Custpower2*Access				2.011			
				[0.953]			
Custpower2*Tech					2.144		
					[0.113]		
Custpower2*Private						0.078 ***	
						[0.004]	
Custpower2*Legal							0.796 ***
							[0.000]
Size	5.599 ***	5.431 ***	5.611 ***	5.623 ***	5.640 ***	5.590 ***	5.528 ***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Sizesq	-0.586 ***	-0.596 ***	-0.585 ***	-0.585 ***	-0.587 ***	-0.581 ***	-0.573 ***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Age	-1.777 ***	-1.806 ***	-2.337 ***	-1.800 ***	-1.814 ***	-1.789 ***	-1.806 ***
	[0.001]	[0.000]	[0.038]	[0.001]	[0.001]	[0.001]	[0.001]
Agesq	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	[0.687]	[0.641]	[0.599]	[0.687]	[0.689]	[0.739]	[0.699]
Access	1.753 *	1.849 *	1.838 *	0.761	1.854 *	1.860 *	1.839
	[0.081]	[0.080]	[0.083]	[0.157]	[0.084]	[0.085]	[0.101]
Tech	1.832 **	1.805 **	1.752 **	1.832 **	0.691 ***	1.782 **	1.722 **
	[0.021]	[0.024]	[0.022]	[0.021]	[0.004]	[0.022]	[0.012]
Export	4.620 ***	4.411 ***	4.390 ***	4.586 ***	4.548 ***	4.496 ***	4.230 ***
	[0.009]	[0.005]	[0.006]	[0.009]	[0.009]	[0.010]	[0.005]
Monop	-6.373 **	-6.533 **	-6.572 **	-6.469 **	-6.450 **	-6.413 **	-6.630 **
	[0.042]	[0.031]	[0.033]	[0.042]	[0.045]	[0.039]	[0.042]
Private	0.000 ***	0.023 ***	0.023 ***	0.024 ***	0.023 ***	-0.023 *	0.020 **
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.078]	[0.047]
Legal	-1.942 ***	-1.961 ***	-1.949 ***	-1.998 ***	-2.018 ***	-1.963 ***	-2.286 ***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Gdpcap	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Growth	-0.417	-0.424	-0.427	-0.428	-0.416	-0.433	-0.434
	[0.438]	[0.376]	[0.425]	[0.437]	[0.449]	[0.484]	[0.893]
Inflation	0.277 ***	0.283 ***	0.285 ***	0.281 ***	0.282 ***	0.282 ***	0.286 ***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
LR chi2	823.53	834.66	827.70	823.53	821.74	835.57	875.41
No. obs.	4,403	4,403	4,403	4,403	4,403	4,403	4,403

Appendix - Variable Definitions and Sources

Variable	Definition	Source
Soldoncred	Percentage of goods sold on credit.	BEEPS Survey
Custpower	Dummy variable that takes the value one if more than 20 percent of the firm's sales go to its three largest customers, zero otherwise.	BEEPS Survey
Custpower2	Percentage of domestic sales sold to multinationals in the firm's home country and to large domestic firms (those with approximately 300 plus workers).	BEEPS Survey
Age	Log of the age of the firm	BEEPS Survey
Size	Log of the number of permanent plus temporary employees (full-time and part-time).	BEEPS Survey
Access	Dummy variable that takes on the value zero if the firm expects that it is impossibe or very difficult to obtain a short-term working capital loan on commercial terms, and one if the firm expects this to be fairly difficult, fairly easy or very easy.	BEEPS 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.	BEEPS 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.	BEEPS Survey
Monop	Dummy variable that takes on the value one if the firm faces less than 4 competitors in the domestic market and expects that demand would not be affected by a price increase of 10 percent, zero otherwise.	BEEPS Survey
Private	Credit extended by deposit money banks to the private sector divided by GDP.	International Financial Statistics and World Development Indicators
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.	International Country Risk Guide
Gdpcap	Real per capita GDP.	World Development Indicators
Growth	Growth rate of real per capita GDP.	World Development Indicators
Inflation	Inflation rate of the GDP deflator.	World Development Indicators