

Trade credit and its role in entrepreneurial finance

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What is trade credit and why does it exist?

When input suppliers deliver goods to their customers, they often do not require to be paid immediately. Instead, suppliers offer credit terms that allow the buyers to delay the payment. This practice is called *trade credit*.

Trade credit transactions normally involve short-term (e.g. thirty to sixty days) delayed payment of purchases of intermediate goods or services. Through delayed payment, trade credit suppliers are effectively funding their clients with short-term debt. However, trade credit has three main differences with respect to other types of corporate debt. First, suppliers lend ‘in kind’; they seldom lend cash. Second, in contrast with bonds or loans, trade credit is frequently not subject to specific, formal contracts between the lender and the borrower. Finally, trade credit is issued by non-financial firms.

Trade credit is one of the most important sources of borrowing at an individual firm level. This is true among all types of firms and throughout different economies. Figure 1 contains cross-country comparisons of the use of trade credit, as found by Rajan and Zingales (1995) and Giannetti (2003). Using a sample of large traded non-financial firms of the G-7 countries, the former authors observed that accounts payable represent, on average, a sizeable 11.5% to 17% of total assets (see Panel A). This makes trade credit the most important type of short-term debt for this sample of listed companies: in the US, trade credit is twice as much as other short-term debt, and this ratio is 1.4 on average across all countries (see Panel B). Giannetti (2003) analyzes a sample of non-traded (hence, arguably smaller) European firms, and finds slightly higher ratios of accounts payable to assets, but lower ratios of accounts payable to other short-term debt. Still,

trade credit can represent up to three times other types of short-term debt, as it is the case in Portugal.

The importance of trade credit can also be seen from the proportion of investment that is financed through it. A study by Beck, Demirgüç-Kunt and Maksimovic (2008) shows, using a survey that covers 48 countries, that on average 19.7% of all investment financed through external sources was done using trade credit; in fact, the authors found that in most countries trade credit is the second most important source of external finance, preceded only by bank credit. Figure 2 contains the fraction of trade credit to all external finance at the individual level, for a selected number of countries. As it may be observed, trade credit represents more than 30% of all external finance in developed economies such as France and the UK.

Recent research has found evidence of the central role of trade credit in the financing of small businesses. In the US, for example, trade credit is used by circa 60 percent of small businesses; such a large incidence of use is not observed in any other financial service, except checking accounts (Mach and Wolken, 2006). Younger firms, particularly start-ups, are particularly reliant on trade credit as a form of external financing (Berger and Udell, 1998; Cuñat, 2007). This empirical regularity is consistent with the notion that firms evolve through a financial growth cycle. At the start-up stage, firms are characterized by being particularly opaque, so financial intermediaries may be unwilling to extend them a loan until they achieve enough tangible assets that could be pledged as collateral. For several reasons that shall be discussed below, suppliers may be better able to provide working capital financing to these firms. In turn, the extension of trade credit to start-ups enables the buyer firm to establish a credit history of repayment, which facilitates access to bank finance in a later stage (Cook, 1999; García-Appendini 2007).

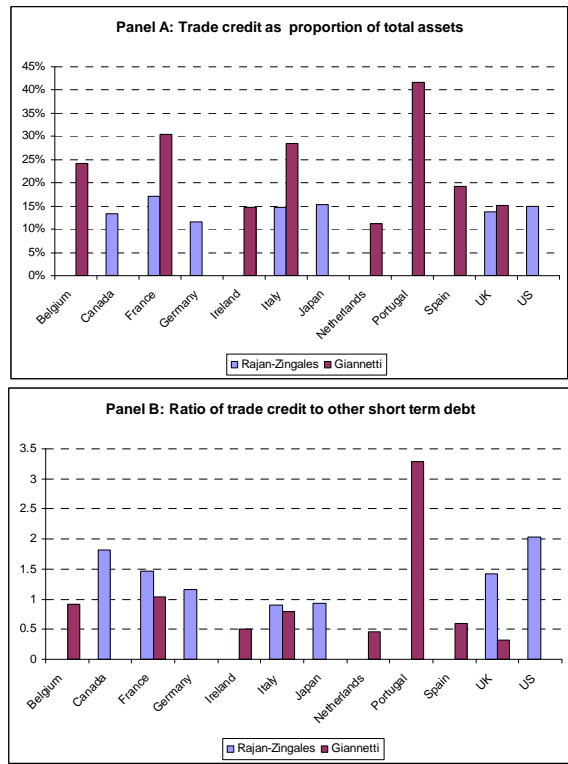


Figure 1

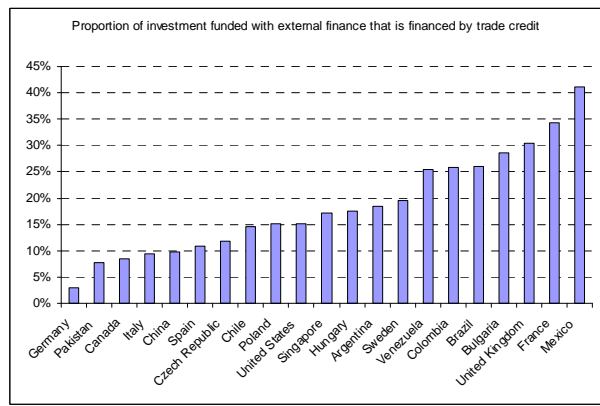


Figure 2

In this chapter, we analyze several aspects of the trade credit agreement. We start by explaining why trade credit is such an extended phenomenon in spite of the existence of a specialized financial sector. Then we discuss several aspects that make trade credit a unique and not fully contractual arrangement, whose value depends to a great extent on the value of the commercial relationship between the supplier and the buyer. In the third

section we focus on the value of trade credit for entrepreneurial firms. Finally, we present our conclusions.

Why does trade credit exist? A survey of the literature

In spite of the crucial role played by trade credit for the development of the economy, it has been much less studied in the academic literature than other types of corporate financing. Several puzzling aspects about the use of trade credit require clarification. Suppliers in many cases charge a zero explicit interest rate when they extend credit. By letting their customers pay the purchases after delivery, suppliers are actually subsidizing their clients with apparently cheaper credit than they may obtain for themselves. This is the first puzzle of trade credit: what are the motives that lead non-financial firms, whose competitive advantage is not in the business of extending credit, to be willing to act as financial intermediaries? Some would argue that, in fact, trade credit is not as cheap as it seems. In fact, some trade credit terms that are very common in practice involve interest rates that are much higher than bank rates.¹ But even if trade credit is expensive, its existence is still puzzling. Given that financial institutions are more efficient lenders, clients could be made better off by taking up a loan from a bank, and paying the suppliers on cash. Thus, the second puzzle of trade credit is the following: why are specialized financial institutions not willing to enter into this potentially profitable business? In other words, what explains the coexistence of trade credit with a competitive specialized banking sector?

Early theories of trade credit were focused on explaining the first puzzle of trade credit – why suppliers are willing to lend – without formally rationalizing why, at times, suppliers may be better able than banks to provide working capital finance. For example, Schwartz (1974) attributed the widespread use of trade credit to the presence of credit constraints that make the shadow value of money differ across buyers and sellers. Credit-constrained buyers that have productive investment opportunities benefit from receiving credit, because they are able to increase their purchase of inputs.² At the same time, the possibility of obtaining higher sales gives suppliers with easier access to capital markets an incentive to offer trade credit to their customers. This simple explanation proposed by Schwartz (1974) does not survive in a broader model setup, as it fails to explain why buyers or sellers would accept credit terms that, in present value, differ from the cash value of the goods. It is necessary to account for some kind of friction in order to make the existence of trade credit possible in the first place. As has been the trend in financial

¹ A more complete discussion about the effective cost of trade credit is presented below.

² Nadiri (1969) is another example of a theory justifying trade credit as a means to boost sales.

theory, modern models of trade credit rely in frictions to explain the existence of trade credit. In what follows we enumerate the different explanations for the existence of trade credit based on the presence of taxes, transaction costs, imperfect market competition, information asymmetries and moral hazard problems.

One of the earliest explanations given to motivate trade credit within a framework that incorporates market frictions is the existence of **taxes** (Brick and Fung, 1984). If there are different tax regimes for the buyer and the seller, trade credit becomes a way to shield from the highest tax schedule. This is because a seller must report taxable income in proportion to the installments of credit received. In this model, trade credit will flow from sellers to buyers (or vice-versa, i.e. through prepayment of goods) depending on the distribution of marginal tax rates among buyers and sellers.

Trade credit may also emerge as a natural way to reduce costs inherent in a firm's cash management. There are two major theories that motivate trade credit because of these **transaction costs**. First, firms facing uncertainty of the time of delivery of the goods may use trade credit to determine in anticipation when there will be a cash inflows or outflows (Ferris, 1981). This allows the buyer to predict when the timing of the cash flows will occur, which eliminates the need to liquidate an asset or to obtain an overdraft facility, thereby reducing the associated costs of obtaining liquidity. Symmetrically, a seller facing random cash inflows has incentives to obtain a more predictable stream of cash and better manage her own liquidity. Second, trade credit can be justified as an efficient way for firms facing cash requirements to minimize liquidity management costs related to excess borrowing or insolvency (Emery, 1984). When short of cash, firms can obtain liquidity through the factoring of accounts receivable. Incentives to offer trade credit rather than obtaining liquidity through demand deposits, loan commitments, or by investing in liquid marketable securities, are due to the higher returns to trade credit.

Another common explanation for trade credit is that it is a response to **imperfect market competition**. In a setup in which there is not much competition in the product market, selective offering of trade credit may dominate a pure-cash payment. This is the main result of Brennan, Maksimovic and Zechner (1988), who in fact propose two alternative scenarios for trade credit to be profitable for suppliers in concentrated product markets. In the first scenario, buyers have different reservation prices for the inputs (for example, because of wealth considerations). By

offering credit to customers with a lower reservation price, and requiring cash for wealthier firms, suppliers are able to increase their sales and maximize their profits. The second scenario assumes that buyers differ in their credit quality, and their types are private information. By offering the same credit terms to all buyers, suppliers are able to reduce the price of the loan for low credit-quality customers. As a consequence, low-quality buyers – who would be credit rationed by banks, due to adverse selection – are able to take up credit from their sellers. On the other hand, creditworthy buyers will find the trade credit too expensive and will prefer to pay cash. Suppliers are, once again, able to place more sales and hence are better off with trade credit than by only requiring cash payments. Within this setting trade credit is subsidized as a way to price discriminate in favor of the low-quality buyers.³

Information asymmetries between buyers, sellers, and outside investors are another common friction that has been assumed for most recent explanations for the existence of trade credit. We can identify two main streams within this literature, depending on where the asymmetries of information reside. The first assumes that the quality of the products is known only by sellers but not by buyers; therefore trade credit is offered as a warranty of product quality (Lee and Stowe, 1993; Long, Malitz, and Ravid, 1993). It can be costly to return a product when the good has already been paid for; therefore it pays to take up costly trade credit and have the option to return the product in case it does not fulfill the buyer's expectations. Trade credit can also emerge as for young or small suppliers to establish a reputation. While these two papers give an explanation of why firms are willing to give and to take trade credit, they fail to explain why banks would be reluctant to enter the profitable business.⁴ Quite differently, Smith (1987) also introduces uncertainty in the product market to develop a more complete theory of trade credit. But the crucial ingredient in her model is the introduction of information asymmetry between buyers and lenders, in general. In fact, this asymmetry of information between buyers and lenders is the defining feature of the second stream of informational asymmetries literature. Within this literature, trade credit emerges because suppliers are assumed to have some kind of advantage over banks to elicit the types of the different buyers, or to control their actions.

³ Another paper that argues that trade credit can be used as a way to price discriminate (and hence, as a way to circumvent the antitrust restrictions that are usually placed on this practice) is Schwartz and Whitcomb (1979).

⁴ Similarly, the models of Ferris (1981) and Brick and Fung (1984), introduced above, fail to explain the coexistence of banks and trade credit. However, Emery (1984) and Brennan et al (1988) are examples of early papers that are able to justify this second puzzle of trade credit. To do so, to their basic framework that assumes transaction costs or imperfect market competition, respectively, they introduce asymmetric information as an additional friction that gives suppliers an informational advantage over banks. Below, we discuss other theories that are based on information asymmetries to justify the existence trade credit.

More precisely, in Smith's (1987) paper information asymmetries are assumed both in the product market and between borrowers and lenders. Different credit terms are offered by suppliers as a way to screen among buyers with different default risk. Buyers will choose the contract that maximizes their profits, taking into account the prices of a bank loan, the prices for trade credit, and knowing that that through trade credit the uncertainty about the quality of the good sold by the seller can be diminished. A firm that chooses credit terms that include a discount period, and uses the discount, reveals that she had access to bank finance.⁵ Similarly, firms that forego the trade credit discount or incur a late payment penalty are paying a high cost for credit. Through these actions the buyer reveals she had no access to cheaper bank finance. In this way the seller is alerted of the risk of high default earlier than under pure cash payments. This information about default risk is valuable to the seller who usually has a large sunk cost investment in their relationship with the buyer. Depending on the credit choices of buyers, sellers gather information about when the buyers need to be monitored more closely, whether credit terms must be modified, or whether the supply of products should be halted for a particular risky customer. With no trade credit, adverse selection would lead suppliers to ration the riskier buyers, with the consequent cost of lower sales. The same mechanism of adverse selection prevents the most risky customers to secure financing from financial intermediaries. In equilibrium, there will be some firms taking trade credit and some firms taking financing from a bank.

Similarly to Smith (1987), Biais and Gollier (1997) argue that suppliers may have an information advantage over banks. However, the superior information available to suppliers is not given by the observation of the contract terms chosen by buyers. Instead, suppliers are able to learn about the operations of their customers through their normal course of business with the buyers, either because they visit their client's premises often, or because the orders placed by the buyers of their input goods give information about their investment opportunities. Biais and Gollier (1997) in fact exogenously assume this monitoring advantage of suppliers over banks, and develop a model in which suppliers are able to relieve credit rationing inherent in a pure bank-credit economy. As long as sellers are able to pledge enough future cash flows as collateral, sellers will extend credit to the customers that they deem to be more credit worthy. From the sellers' actions, banks infer the credit quality of the buyers and will also extend credit.

⁵ Notice that, as in Brennan et al (1988), in this model trade credit is also used as a way to price discriminate among buyers.

Burkart and Ellingsen (2004) endogenize in their model the assumption that suppliers may have an information advantage over banks. However, differently from Biais and Gollier (1997), suppliers are not necessarily assumed to be better at screening among different borrowers. Instead, their information advantage relies on a better control of the buyers' actions, i.e. a reduction of **moral hazard**. The input supply itself provides the information that allows sellers to control buyers. A lender that sells an input knows immediately that the buyer is undertaking a productive activity. Instead, a bank lends cash which can be easily diverted by the buyer. A bank that wants to avoid cash diversion must incur a monitoring cost. On the contrary, suppliers obtain information about the productive function of the firm for free, and as so are better fitted to control moral hazard. As a consequence, suppliers may be willing to lend to firms that would be credit-rationed by banks. Also, as in Biais and Gollier (1997), the bank infers from the observation of a trade credit sale that the buyer is undertaking an investment, and can be induced to complement the credit for firms that would be otherwise rationed.

Similarly to Burkart and Ellingsen (2004), Cuñat (2007) also presents a model in which suppliers are better than banks at controlling the actions of borrowers. However, in the latter the advantage stems from an ability to enforce debt payment. If external parties cannot verify the ex-post realization of their borrowers' returns to production, buyers may default strategically on their obligations. However, if buyers cannot easily find a substitute for their current supplier—either because the input required is tailor-made to the needs of the buyer and substitute inputs are too generic, or because suppliers are scarce and costly to find, or for the existence of any other sunk cost in establishing a commercial relationship—then they will prefer to honor their trade credit obligations: otherwise the supplier could cut off all future provisions. The ability of suppliers to enforce debt payments better than banks is therefore very closely linked with the commercial interaction between the supplier and the buyer. In fact, the same commercial links that provide an advantage to suppliers over banks in controlling the actions of buyers motivate the demand for trade credit. The reason is that, by continuing with the same supplier, the buyer may benefit from provision of liquidity in case of a temporary liquidity shock.⁶ Therefore, as long as there exists a positive surplus of continuing doing business together, there will be benefits for both buyers and sellers of establishing a credit relationship. In this model, banks are an easier target for a strategic default. Banks are assumed to be perfectly competitive, so withdrawal of future finance from a bank has little effect on the delinquent firm's immediate operations. This makes it more difficult

⁶ The idea that suppliers may be willing to support customers facing financial difficulties is also apparent in Wilner (2000), in a model that explains why trade credit rates are apparently higher than bank rates.

for banks to be able to enforce payment and they may not be willing to provide finance when suppliers are.

Finally, suppliers may be also have a competitive advantage over banks in liquidating collateral. One example of a model in which suppliers are exogenously assumed to place a higher value to the repossessed inputs in case of a default is Frank and Maksimovic (2005). This collateral liquidation advantage can be motivated by the fact that suppliers establish a network of buyers, so they are able to quickly repossess the inputs and resell them to others in case one of their customers defaults. On the contrary, collateral is much more costly to liquidate for outside investors who lack a market to reposition the seized goods. In a world in which buyers and sellers are privately informed about their creditworthiness, trade credit emerges as a natural mechanism that reduces costs and improves overall efficiency. Suppliers will lend to the less creditworthy customers, who are more likely to default – and credit rationed by banks. Banks, on the contrary, finance higher quality firms.

Theory meets reality: The empirical evidence

Much of the empirical evidence on the validity of each of these theories of trade credit has been done using the Survey of Small Business Finances (SSBF), carried out by the Board of Governors of the Federal Reserve Bank on a sample of small US firms. The dataset is especially suitable to test for these theories because it contains a number of questions relative to the use of trade credit by the surveyed firms, as well as a number of balance sheet and income statement items at firm level. Elliehausen and Wolken (1993) first use this data set in order to find out whether the data is consistent with transactions costs, and/or with information asymmetry theories. More in particular, within this last category they test whether trade credit use is motivated because of an unavailability of specialized credit – i.e. rationing in the institutional markets for credit. They find that the use of trade credit and the proportion of accounts payable are closely related to the volume of total purchases and to a greater variability in the timing of delivery of purchases, supporting the transactions cost theory put forth by Ferris (1981). However, they also find that a significant fraction of trade credit purchases are due to information asymmetries: the riskiest firms resort more to the use of trade credit, and pay a higher

proportion of trade purchases after the due date. Both transactions costs theories and information asymmetries are economically significant to explain the demand for trade credit, although the authors argue, through their estimations, that transactions costs may explain almost twice as much of the volume of payables than information asymmetries as a motive for using trade credit.

In a related study, Petersen and Rajan (1997) also explore the different theories of trade credit with the SSBF data set. Unlike Elliehausen and Wolken, they use a simultaneous equation model that estimates both the demand and the supply for trade credit. They first analyze the motives that lead to the offering of trade credit. They find that the more creditworthy firms, as well as those that have greater access to institutional credit are able to offer more credit to their clients, a finding that is consistent with all of the above theories of trade credit. Also, consistently with the theories of imperfect product markets and price discrimination (Brennan et al, 1988), they find that firms that have higher profit margins offer relatively more trade credit. Finally, firms with negative income and negative sales growth have a higher proportion of accounts receivable. To the extent that an increase in accounts receivable is due to a lower willingness of buyers to repay a distressed firm, these last findings are compatible with Cuñat (2007): the threat to cut-off future supplies, and hence the debt enforcement, is lower for these distressed suppliers.

When studying the motives that lead buyers to take trade credit, Petersen and Rajan find that firms with higher access to institutional credit use trade credit less, in spite of being offered relatively more credit from their suppliers. This finding confirms the perceived wisdom that trade credit is more expensive than institutional finance, and gives credence to the information asymmetry theories of trade credit. In fact, suppliers do not offer more credit to firms that have established relationships with financial institutions, suggesting that suppliers generate their own information about the creditworthiness of their clients, and lends support to theories of information advantage of suppliers over banks (Smith, 1987; Biais and Gollier, 1997; Burkart and Ellingsen, 2004). Consistently with Wilner (2000) and Cuñat (2007), suppliers tend provide liquidity support to growing firms facing financial difficulties. Finally, the authors also find that suppliers offer more credit to

firms with a lower ratio of finished goods to inventory, providing validity to theories posing a higher ability to liquidate collateral by suppliers (Frank and Maksimovic, 2005).

Overall, the results of Petersen and Rajan (1997) are consistent with most of the information asymmetries theories of trade credit, but do not particularly favor any one over the others. Similarly, in a study that uses a different, ad-hoc survey, Ng, Smith and Smith (1999) find evidence in favor of information-based theories of trade credit – and reject theories that predict trade credit as a tool to price discriminate, as well theories that pose trade credit as a source of liquidity for the sellers – but do not distinguish among these informational theories of trade credit. Instead, Burkart, Ellingsen, and Giannetti (2009) are able to distinguish among these theories by extending the analysis to include, apart from the volume of trade credit, other contract characteristics as well as the nature of the traded good. Using the SSBF dataset, the latter authors find that more credit is offered, and for longer periods, for services and more differentiated products; moreover, contrasting with what was found previously, trade credit is not necessarily offered more to firms with higher credit quality. These findings are mostly consistent with theories that give suppliers an advantage in controlling the actions of the buyers (Burkart and Ellingsen, 2004; Cuñat, 2007). On the other hand, theories that pose a collateral liquidation advantage on suppliers are not able to explain why trade credit is usually extended in the US for periods longer than 10 days, which is the maximum period after delivery in which suppliers are allowed to repossess the goods, according to US laws. Similarly, the data does not support the idea that trade credit is used to sustain firms facing financial difficulties: buyers of services and differentiated products do not receive more support from their suppliers. Finally, theories that suggest that trade credit can be used to let buyers assess product quality, which would imply that suppliers with established reputation should extend less credit, find limited support in their analysis.

The structure of trade credit contracts and its implicit cost

The standard trade credit contracts

There are two basic types of trade credit agreements. In the first type, net terms, the supplier requires full payment within a certain period after the delivery of the good. The length of the period is usually specified in the contract; for example, a “net 30” agreement would mean that payment is due within 30 days of the product delivery. If the buyer does not pay within the net period, the supplier could charge a penalty for late payment.

The second common trade credit agreement is called two-part terms. In this contract, the supplier may offer a discount if payment is made within a certain period, which is typically shorter than the net payment period. For example, a “2/10 net 30” agreement would give the buyer a discount of 2% if payment is realized by the tenth day following delivery. If the buyer fails to take advantage of the discount, she still has 20 additional days to pay the full price of the goods without being in default – the net period has a total duration of 30 days. Finally, as with net terms, suppliers could charge penalties if the buyer still fails to meet the payment after the net terms expired. The two basic trade credit agreements are illustrated in Figure 3.

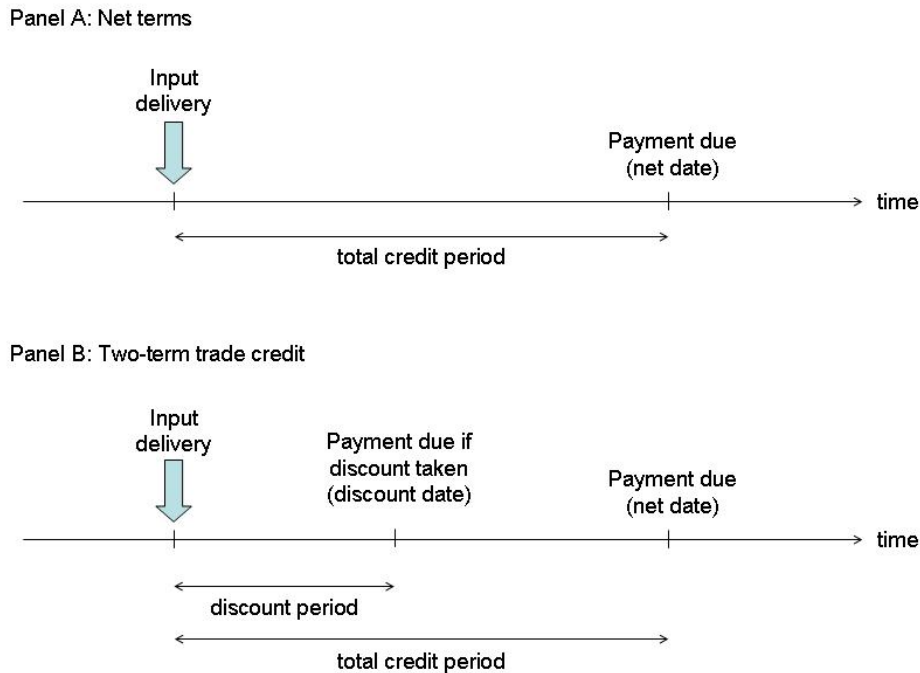


Figure 3: Trade credit terms

Net terms and two-term trade credit are used roughly in the same proportion: broadly half of the firms that use trade credit and were surveyed for the 1998 SSBF were offered a discount for early payment; the other half was only offered net terms. Table 1 reports the most common net terms agreements offered by these firms' most important supplier, while Table 2 reports a few examples of the most common two-term contracts (there were more than 200 different two-term contracts offered). From the tables, we can infer that trade credit is essentially short-term debt: in fact, over 90% of the firms must pay within 30 days of delivery. Consistently with the results of Ng et al (1999), we may see in the tables that the most common net terms trade credit agreement is by far "net 30", while the most common two-term contract is "2/10 net 30".

An interesting feature of the terms offered by suppliers is that they may be very different across different industries, but they are relatively stable within each industry and along

time (Ng et al, 1999). This suggests that there is not much competition among suppliers on the quoted terms for trade credit, and indicates that suppliers prefer to change the price of the good, rather than the price of credit, to accommodate changes in demand. In the rest of this section we shall further discuss about the price of trade credit, its relationship with the price of the good sold, and other characteristics of the trade credit contract that make it unique.

The cost of trade credit

Unless the price charged to credit buyers is higher than the cash price offered by suppliers, net terms trade credit is essentially a free credit if payment is realized within the due date. In the two-term agreement credit is free only if payment is realized during the discount period, but after that the implicit interest rate can be very high. For example, the common “2/10 net 30” contract has an implicit rate of foregoing the discount of 43.9%.⁷ Table 2 shows that other two-term contracts can have considerably higher implicit rates. Yet, in spite of the large cost of foregoing a discount, firms consistently pay on average one third of their trade credit purchases after the discount has expired.

Net terms	N	% Net terms	% TC paid late	Annualized penalty if late payment	Avg. payment stretch (DPO) if positive (days)	Avg. surcharge for every delayed dollar (cents)
1-7 days	18	2.5%	3.4%	5.12%	61.3	0.76
8-10 days	52	7.1%	11.4%	10.24%	84.8	2.05
15 days	34	4.7%	3.5%	11.08%	89.9	2.21
16-20 days	21	2.9%	15.7%	10.66%	70.9	1.44
21-30 days	531	72.8%	17.2%	14.81%	53.8	0.92
31-45 days	15	2.1%	12.4%	6.76%	59.8	0.27
46-60 days	31	4.3%	21.6%	6.58%	65.3	0.09
Other	27	3.7%	18.3%	6.53%	60.6	0.29

⁷ To calculate the cost of foregoing the discount, we assume that payment occurs the last date during the net period. The annualized rate of a given two-term contract is given by $r_i = \left(\frac{100}{100 - d_i * 100} \right)^{\left(\frac{360}{t_2 - t_1} \right)} - 1$, where d_i is the discount rate and t_2 and t_1 are the net and the discount dates, respectively. When the discount period and the net period coincide, we assume that the offered discount is valid for one day, so the denominator of the exponent equals one in this case.

Table 1: Net terms offered to firms in the SSBF. The leftmost column of this table contains the most common net terms offered by suppliers to the firms surveyed in the 1998 SSBF. The next two columns contain the number of firms that were offered each contract, respectively in absolute terms and relatively to the total number of firms that are offered net terms. The third and fourth columns contain the average percentage of trade credit purchases that surveyed firms paid after the due date and the average annualized penalty required if payment is delayed. The last two columns contain the average number of days payable outstanding (DPO), if DPO is positive, and the average cost for each dollar paid after the due date.

Two-term contract	N	% Two-term	Cost of foregoing discount	% TC purchases forego discount	% TC paid late	Ann. penalty if late payment	Avg payment stretch (DPO) days	Avg. surcharge per delayed dollar (cts)
0.2 / 10 net 21-30	15	2.1%	3.7%	33.5%	8.6%	6.76%	40.7	4.74
0.5 / 10 net 21-30	17	2.4%	9.4%	52.8%	16.6%	10.88%	20.4	8.13
1.0 / 10 net 10	13	1.8%	++	28.5%	6.2%	13.92%	25.9	43.12
1.0 / 10 net 21-30	69	9.7%	19.8%	44.4%	19.8%	17.97%	51.1	18.87
1.0 / 15 net 21-30	9	1.3%	27.3%	55.6%	26.1%	11.20%	45.8	18.76
1.5 / 10 net 21-30	13	1.8%	31.3%	43.5%	19.5%	11.05%	40.3	24.01
10.0 / 10 net 21-30	9	1.3%	566.2%	35.6%	27.8%	22.74%	46.3	211.58
2.0 / 10 net 8-10	17	2.4%	++	35.3%	5.9%	10.73%	99.4	20.11
2.0 / 10 net 21-30	173	24.3%	43.9%	33.9%	12.7%	16.03%	38.6	43.69
2.0 / 15 net 21-30	31	4.4%	62.4%	37.2%	14.5%	13.03%	34.8	48.76
2.0 / 30 net 21-30	13	1.8%	++	27.7%	3.5%	8.83%	46.9	67.55
3.0 / 10 net 21-30	9	1.3%	73.0%	44.8%	9.8%	10.03%	16.4	348.84
5.0 / 10 net 21-30	29	4.1%	151.8%	36.2%	7.4%	19.37%	45.0	82.91

Table 2 A few common two-term agreements offered to firms in the SSBF. The leftmost column of this table contains common two-term agreements offered to firms in the SSBF by their most important supplier. The first two columns contain the number of firms receiving each contract, in absolute and percentage terms relative to the total of firms being offered two-term trade credit. The third column corresponds the annualized interest rate corresponding to foregoing the discount offered by the supplier (++ means the annualized implicit interest rate is higher than 1000%). The fourth and fifth columns contain, respectively, the percentage of all trade purchases that were made after the discount period and after the due date. Finally, the last columns contain the average number of days payable outstanding (if positive) and the cost, in cents, for each dollar paid at the average DPO (if the DPO is positive).

The cost of trade credit can be substantially higher if we consider penalties charged for late payment. As Table 1 and Table 2 show, buyers in the 1998 SSBF sample paid, on average, 10 to 20% of their purchases after the due date. The median penalty rate for the

deals with an explicit penalty was equivalent to an annual rate of 29.7%. Taking into account the average number of days after the due date in which payment occurs (i.e., the difference between the days payable outstanding, or DPO, and the effective maturity of the contract), late payment can represent a cost of up to 2.2 cents for each dollar paid after the due date on a net terms trade credit contract. For a two-term contract, the cost of foregoing the discount must also be added, leading to a still higher cost. For example, a firm that pays 9 days after the due date of a 2/10 net 30 contract will end up paying up to 43.7 cents for each dollar paid after the due date. The cost can reach a whopping 211 cents per delayed dollar for a firm that pays 15 days after the due date in a 10/10 net 30 contract.⁸

Trade credit flexibility

While it is true that payment after the due date can substantially increase the cost of trade credit, many suppliers do not charge an explicit penalty for late payment. In any case, as can be seen in the above tables, late payment of credit purchases is generalized, and this phenomenon is quite specific to trade credit and is apparent across different countries and industries. This distinctive feature shows how trade credit contains an extra degree of flexibility when it comes to repayment. Suppliers have the right to liquidate the buyer or, as we explain in the next section, to repossess the intermediate goods delivered whenever a buyer does not repay on the stated maturity. However, sellers often decide to give the buyer extra time to repay. The ongoing relationship between buyers and sellers is crucial to understand the nature of this late payment. The incentives for the seller to allow for late payment are stronger than the ones of an arm's length lender when the seller has some form of stake in the growth and survival of the buyer.

⁸ To calculate the cost in dollar terms of late payment for the j -th net term agreement, we assume that the net period, T_j , corresponds to the upper bound of each interval (e.g. $T_j=60$ days in the case of the 46-60 days net terms). Therefore, the effective cost for each dollar paid after the due date for the j -th contract agreement is calculated as $c_j = \left(1 + \frac{P_j}{100}\right)^{\frac{(DPO_j - T_j)}{30}} - 1$, where P_j is the average monthly penalty charged for late payment of the the j -th net term agreement, and DPO_j refers to the average number of days payable outstanding (DPO), if the DPO is positive.

From the point of view of the buyer, the option to pay late can be considered as some form of insurance against temporary liquidity shocks. If late payment carries an explicit penalty, the value of this option may be limited, as its cost (or part of it) is paid ex-post, precisely when the liquidity shock has hit. However it is still of some value if the liquidity shock is temporary and late payment allows the buyer to postpone the repayment of trade credit even at a penalty rate. Whenever late penalty does not carry an explicit penalty, the option to pay late provides explicit insurance against liquidity shocks. This form of liquidity insurance can be extremely useful for small and entrepreneurial firms that have more volatile sales and are financially more fragile. This may be the case for small firms that, despite being young, have already built up a relationship with their suppliers, but less so for firms that have just started operations. Whenever sellers are easy to substitute, the future revenue stream that sellers expect to obtain from their buyers cannot be too high. Absorbing the cost of late payment would only be profitable if there is some profitable future commercial relationship to keep. Theoretically, Wilner (2000) assumes that suppliers incur sunk costs that are specific to their buyers; in the case of renegotiation of debts, suppliers therefore give more concessions to customers than banks do. Cuñat (2007) assumes that it takes time to find the right seller for a given good and that therefore there is some relationship surplus to be split as long as an existing commercial link is not broken. Both papers predict a more lax approach to liquidation of trade credit issuers than other forms of creditors and a certain self selection of lower quality debtors towards trade credit. This self selection may also contribute to the high cost of trade credit.

From the point of view of the seller, it may be natural to allow for late payment in order to guarantee the survival and foster the growth of a buyer that to some extent is linked through a long-term commercial relationship. This is more likely to be the case for a regular supplier of intermediate goods. However the cost of late payment needs to be factored in when calculating the cost of issuing trade credit and probably most of this cost is transferred to the buyer through a higher interest rate and late payment penalties. It is important to realize that late payment penalties may be hard to enforce. If late payment is associated with liquidity shocks that threaten the survival of the buyer, then even if

legally the seller has a right to impose penalties onto late payers it may decide not to do so, given that it may make things worse in terms of the future prospects of the buyer.

Empirically, Cuñat (2007) shows that, relative to other forms of funding, trade credit grows (or shrinks at a slower pace) when firms experience periods of illiquidity or negative growth rates. This phenomenon is however limited to moderate shocks; whenever the shocks are large, trade credit gets reduced much faster than other forms of credit. Similarly Petersen and Rajan (1997) show that firms are willing to extend more trade credit to firms in financial distress, but only when they expect an increase in the flow of sales. These results generally highlight the additional payment flexibility given to sellers whenever they expect liquidity shocks but they still keep substantial growth opportunities.

The frequent occurrence of late payment highlights that it is hard to understand trade credit as a fully contractual, independent, one-off transaction. The repeated nature of buyer-seller relationships and the fact that trade credit terms are often violated and renegotiated are all manifestations of a different nature. In most cases trade credit has to be understood as a multi-period, highly non-contractual type of credit that interacts with an ongoing commercial relationship. In this sense, bargaining, renegotiation and hold-up problems are an integral part of everyday's trade credit transactions. The contractual and institutional conditions of the transactions have to be seen more as the framework that defines the status quo and the payoffs in case of disagreement than as the actual terms of the deal.

The indivisibility of prices and interest rates

Another feature that shows that trade credit is not a fully contractual agreement is given by the impossibility of calculating the true price of the contract. This is because the extension of trade credit involves two transactions: a real and a financial one. Through trade credit the exchange of the good is bundled with a credit operation, and there may be cross-subsidies between the two transactions.

Suppose that suppliers could distinguish among different buyer types. When interacting with a good quality buyer with a small probability of default, the seller could offer the good at its real cost, and bundle it with relatively cheap credit terms – say, with the interest rate that would be charged by the bank. If the same supplier offers the good to a buyer with a higher probability of default, then instead of raising the price of the credit he could raise the price of the good and offer the same contract as to the good quality buyer. With this operation, the seller obtains compensation for bearing a higher default premium through the physical good and not through the credit contract. The implicit price of credit is the same for the two buyers; however, without information about the price of the good, the real price of credit remains unknown.

A different picture emerges whenever the supplier cannot distinguish among different buyers. In this case, as in Smith (1987) and Brennan, Maksimovic and Zechner (1988), trade credit terms can be used as a way to induce buyers to select the most suitable contract terms according to their default rates. If trade credit were always used to price discriminate then, depending on when payment is done, the implicit interest rates paid by each buyer would be very close to the real interest rates of trade credit. However, there is only limited evidence that trade credit informs suppliers about the financial possibilities of their clients. In a survey to For example, a majority of the firms surveyed by Ng et al (1999) declared that the use of trade credit gave no or only occasional information to suppliers about the possibilities of buyers to secure financing elsewhere. Similarly, a majority of firms surveyed by these authors change the price of the good rather than the credit terms in order to accommodate adjustments in the demand. These findings suggest that the prices calculated above should be taken with a grain of salt and not taken literally to be directly comparable with interest rates charged with a financial intermediary.

The seniority of trade credit

As we pointed out before, one of the drivers of the phenomenon of late payment is the difference between an ongoing customer relationship and a customer in financial distress.

Trade credit has interesting features in terms of how much it is worth in case of financial distress, so it is important to analyze its properties when there are financial difficulties or bankruptcy. Given its prevalence among small and young firms and the fact that these are the firms with a higher probability of going bankrupt, trade credit seniority is an important driver of its use and characteristics.

Formally, most legislations regard trade credit as one of the most junior forms of credit. In case of formal bankruptcy, if there is outstanding unsecured trade credit it normally ends up at the end of the debt priority queue. For this reason the recovery rates of trade credit are small in formal bankruptcy procedures that involve liquidation. However there are several caveats to this formal status. First, some trade credit is secured by the intermediate goods delivered and suppliers may also be in a privileged position to liquidate them. Second, the short term nature of trade credit and good information on the seller's side may prove an advantage if financial distress precedes a potential default. In what follows we develop these two arguments in more detail.

It is often the case that, in case of default on a trade credit contract, sellers have the right to repossess the goods delivered and not yet paid. This may happen by default if the legal environment considers that the sale has not been completed until payment or if it considers that this is an inherent right of the seller whenever trade credit has been issued. Collateralization may also be implemented contractually. The goods delivered act therefore as guarantee for the trade credit given without the need for an intermediary and with very little transaction costs. This arrangement can be of great value for small firms, as they are often short of both collateral and cash.

Given that the value of the goods delivered is by construction larger or equal to the trade credit issued it may seem that the trade credit contract is a very easy way to set up collateralized credit deals. However, the characteristics of the good delivered may make this collateral value vary a lot across industries.

One factor that may limit the value of this collateral is that the ability to repossess the good is restricted to goods that have not been sold or transformed.⁹ In this sense whenever the sales rotation of the good is much faster than the maturity of trade credit the collateral value of the goods delivered may not be very high (consider for example meat supplies that have to be paid 90 days later). Also intermediate goods that cannot be identified after purchased have no collateral value (consider for example the case when milk or oil from different producers is mixed together). Finally, even if the sales rotation of goods is slow and they come from a single producer it may be the case that they are transformed very quickly into final goods.

The degree of re-saleability of the goods delivered is also an important driver of the collateral value of trade credit. If goods are tailor made for the seller maybe their re-sale value is lower than the amount of trade credit that they guarantee. An interesting ramification of this argument is that the resale value of repossessed goods may be different for banks and sellers (Frank and Maksimovic, 1999; Santos and Longhofer, 2003). When goods are buyer-specific, they may have a lower collateral value, but buyers may have tighter relationships with their suppliers (for example if getting the right specific design takes time and effort). On the contrary, when goods are seller-specific the link between buyers and sellers may be more tenuous; however the collateral value of these goods improves.

In sum, the collateral value of the delivered goods will be larger for those goods with long sales and transformation rotations, easy to identify and whenever the sales networks are important. It is not surprising that goods like cars and books that fulfill these characteristics are often offered to dealers and bookstores in deposit from the wholesalers. That is, the contract specifies an indefinite maturity of trade credit until the good gets sold at a retail level.¹⁰

⁹ See Franks and Sussman (2005)

¹⁰ However a too liquid market for intermediate goods may also be detrimental for the use of trade credit. Burkhart and Ellingsen (2004) show that the relative illiquidity of intermediate goods as compared to cash makes trade credit useful in solving some agency problems between creditors and borrowers given that borrowers are forced to use the intermediate goods for productive purposes and are not tempted to sell them and divert funds.

The issue of collateralization is not the only special feature that trade credit has when it comes to bankruptcy and financial distress. The combination of trade credit being a short-term form of debt and a possible informational advantage on the supplier's side may make it effectively quite a senior form of credit, even though, formally is a very junior contract. If suppliers are able to forecast periods of financial distress before other creditors they may decide to cut short the supply of trade credit and ask for payment on delivery well before financial distress manifests itself. The advantage of sellers when it comes to assessing the creditworthiness of their buyers has been used as a building block in several theoretical and empirical papers (Smith, 1987; Biais and Gollier, 1997; Garcia-Appendini, 2007). The sellers of intermediate goods have often a close relationship with their buyers, and they are able to observe the flow and nature of the intermediate goods purchased, therefore inferring the sales and production patterns of the firm.

In case of reaching a formal bankruptcy procedure, the court could observe that bankruptcy was effective before the sellers claimed back their trade credit. Bankruptcy would then be declared retrospectively and trade creditors would be treated as junior claimants. However, this is in general unlikely given that the seller normally would base its decision on information that is unobservable to others.

Note that the argument of buyers being able to forecast financial distress and shut down the flow of trade credit seems to be at odds with trade credit lenders being less prone to foreclosing or filing for the liquidation of their buyers. The importance of one or the other argument relies crucially on two issues: first, whether shocks are temporary or permanent; second, whether there is a close relationship between buyer and seller. For temporary shocks in close buyer-seller relationships, sellers are likely to behave as liquidity providers in case of distress. However, when shocks are permanent and when there is not a large relationship-based surplus at stake, suppliers are likely to be the first lenders that abandon ship.

As a whole, the issue of trade credit and seniority is a complex and interesting one. The level of guarantees that trade credit offers can be very heterogeneous across industries. The ability to have advance information about the financial health of the buyer is also likely to differ across industries and buyer-seller pairs. These have to be factored in when it comes to assessing the recovery rates of trade credit if the buyer firm enters financial distress and eventually bankruptcy.

Trade credit in the context of entrepreneurial finance

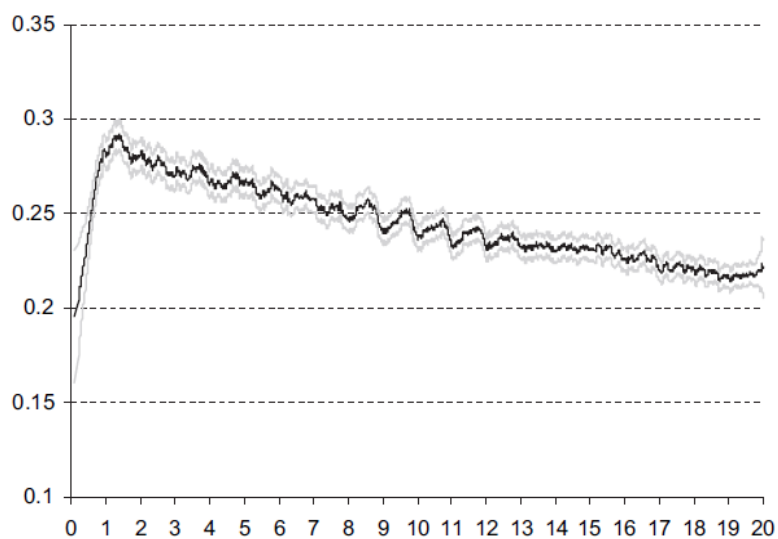
Trade Credit and Funding Startups

As seen in the previous sections, trade credit issuers rely on different information and enforcement than banks. The liquidation value of trade credit may also be superior for the sellers than for a third party. For all these reasons trade credit is one of the key sources of funding for small entrepreneurial firms that lack collateral and a credit history. It can be inferred from the differences across Figures 1 and 2 that trade credit is more prominent among smaller firms. Furthermore, it is well documented that trade credit is more common among newly created firms and those with less tangible assets (Berger and Udell, 1998; Elliehausen and Wolken, 1993; Cuñat 2007).

The use of trade credit is not restricted to funding working capital only. If the turnover of goods is sufficiently fast with respect to the maturity of trade credit, it can be used to finance a substantial part of the fixed assets of the firm. Think for example of a gas station that needs to refill its main tank weekly and pays for those supplies using 60 days trade credit. If customers pay with cash, that gas station has roughly the equivalent of 8 full tanks worth of trade credit. This may be enough to fully fund the whole of the fixed assets of the firm. Of course, if customers paid themselves using some form of trade credit, this would increase the necessary working capital and should be factored in when calculating how much fixed capital can be funded using trade credit. In general factors

like the rotation of sales, the form of payment of customer, the value added of final goods with respect to intermediate goods and the needs of working capital would determine how much positive (or negative) net financing can a firm expect to receive through trade credit.

Two important caveats have to be taken into account when evaluating how useful is trade credit in funding start-ups. First, as discussed in the previous sections trade credit often has very high implicit interest rates. Whenever other forms of funding are available, firms should try to take advantage of early payment discounts whenever these are explicit or to try to bargain for lower prices in exchange of early payment. Second, given that the availability of trade credit is linked to the existence of a close link between buyer and seller, trade credit may not be offered to recent start-ups. The following graph shows the relationship in the SSBF between trade credit over assets on the vertical axes and the age of firms in years on the horizontal axis.



Trade credit starts at relatively low levels and grows very fast until peaking on the second year of the firm's life. This sharp growth is likely to be associated with the increased availability of trade credit. After the second year, firms increase their survival chances; they also have a credit history and lower levels of total debt. For all these reasons trade credit gets gradually substituted by cheaper forms of finance.

Overall, one can see trade credit as a valuable tool for small firms that not only can be used to fund working capital but also it can be used to fund fixed capital.

Trade credit as relationship lending and interactions with bank credit

As discussed before, the commercial relationship between a supplier and a customer may play a substantial role when it comes to enforcing of trade credit repayment. A certain technological specificity or simply a long term commercial relationship gives suppliers an advantage in enforcing non-collateralized debts. This advantage allows suppliers to be competitive lenders even in the presence of a competitive banking sector. The extra enforceability power of suppliers comes from the fact that they can threaten to stop supplying intermediate goods to their customers. Whenever finding a new supplier is costly, customers will pay back their debts before switching to another supplier (Cuñat 2007).

When considering trade credit as a source of finance it is important to also consider its interaction with other funding options and in particular with bank credit. These interact both through informational channels and by altering the collateral levels and expected growth rates of the firm.

On the informational side, banks may see the concession of trade credit as a positive signal of the view of the seller about the buyer's creditworthiness. There is some direct evidence that trade creditors gather information about their buyers (Uchida, Udell and Watanabe, 2006), by having a close relationship with repeated buyers or simply by observing the flow of intermediate inputs they are able to assess the creditworthiness of their buyers in a way that is different from the information gathered from banks. Even if this information is not superior to the information held by banks, it may be useful for banks to infer it from trade credit relationships and use it as additional information. Biais and Gollier (1997) present more formally this argument and also show that the high trade

credit interest rates may be a way to avoid undesirable equilibria in which buyers and sellers collude to send a misleading signal to the banks.

Empirically, Garcia-Appendini (2007) shows that the availability of trade credit is used by banks as a certification of the creditworthiness of the firm. Banks also react to the denial (or refusal to roll over) of trade credit depending on the level and the type of information that they hold on their borrowers. The denial of trade credit is an action in which the private information of the supplier gets partially revealed, this should be very important for those banks that have less information about their borrowers and this is precisely the effect found empirically. In a related work, Burkart, Ellingsen and Giannetti (2009) show that the use of trade credit is related to the nature of the transacted good. The sellers of differentiated products and services have larger accounts receivable than suppliers of standardized goods. This evidence favors theories of trade credit based on sellers having superior enforcing power and a poor ability of buyers to divert goods delivered on credit onto non productive activities. Furthermore, firms receiving trade credit are able to get financing from relatively uninformed banks. This positive correlation is at least suggestive of a certain informational complementarity between trade credit and bank credit.

A common theme in the academic literature on trade credit is whether they should be considered as complements or substitutes. The answer to this question depends on the type of firm considered and, in particular, on whether the borrower is financially constrained or unconstrained. If the borrower is growing fast, financially constrained and rationed in the credit market, it would be willing to borrow at rates above the ones at which it is receiving credit. In this situation, bank credit and trade credit should act as complements. When additional trade credit is received, then additional bank credit is available either through an informational channel or through additional collateral induced by trade credit purchases. This should generate a positive correlation between both sources of credit so they would appear to be complements. The picture is quite different for non-growing, financially unconstrained firms. For those, trade credit may be the marginal source of funding, but it is a relatively expensive one when compared with bank

credit. If additional bank credit is available, firms are likely to substitute trade credit by using more bank credit and hence they can be seen as substitutes.

Trade credit as a way to foster sales

A common argument among practitioners in favor of the extension of trade credit is that it is a tool that helps fostering sales. From a theoretical point of view, this is an obvious role of trade credit when sellers are less financially constrained than buyers. Sellers may have better access to financial markets than their buyers, for example because they have more tangible assets or a better credit history. At the same time, sellers may see buyers as a lesser risk than banks. As already mentioned, this can be due to a number of reasons including informational advantages, better enforcement or better liquidation options. When this is the case, by extending trade credit the sellers may act as intermediaries between the financial sector and their buyers.

Empirically, the papers by Nilsen (1994, 2002) show that the evolution of trade credit throughout the macroeconomic cycle are consistent with this view. Large sellers with good credit ratings tend to extend more trade credit in downturns and act as intermediaries between the financial sector and their buyers. Fabbri and Klapper (2009) find empirically that firms may be using trade credit as a way to foster sales. Suppliers with relatively weaker market power are more likely to extend trade credit and have a larger share of goods sold on credit. However they also find that seller's access to bank financing and profitability are not significantly related to trade credit supply.

When sellers act as intermediaries they may fund themselves by using long-term debt, commercial-debt (Calomiris, Himmelberg and Wachtel 1995) or trade credit from their own suppliers. Along these lines Fabbri and Klapper (2009) also find some evidence of trade credit given and trade credit taken being strongly correlated. Firms that receive trade credit from their own suppliers are more likely to extend trade credit to their customers, and to "match maturity" between the contract terms of payables and receivables. Part of this correlation may be due to product characteristics (for example if

the nature of goods makes them easier to collateralize). Wilner (2000) shows theoretically that firms with a higher risk of default may self select themselves towards borrowing through trade credit and not through bank credit. For some of these more constrained firms receiving trade credit may be a necessary condition to be able to purchase. Daripa and Nielsen (2005) show that trade credit may be necessary to induce buyers to hold inventory risks and, in that sense, extending additional trade credit can be a way to foster sales.

Trade credit can also foster sales by allowing customers to check the quality of the goods delivered before final payment (Smith, 1987; Lee and Stowe, 1993 and Long, Malitz and Ravid, 1994). The underlying assumption of these models is that returning imperfect goods to the supplier in exchange for a refund is not feasible or at least costly to do, for example if the relationship with the seller may end after the current deal. In a more general framework, we can think that the timing of payment for a particular delivery will depend on which agent has a potential hold-up on the other. Prepayment, cash payment and trade credit will be associated with different types of goods. Trade credit may be optimal when the quality of goods is uncertain, while pre-payment might be the rule when goods take time to build and are buyer-specific.

Trade credit and the business cycle

The evolution of trade credit along the business cycle has attracted substantial attention both academically and from the point of view of policymakers.

Meltzer (1960) shows when monetary policy gets tighter, large liquid firms increase the amount of trade credit extended to smaller ones. Similarly, Nilsen (1999) shows how different types of firms use trade credit at different phases of the business cycle. Small firms borrow to substitute bank loans during monetary contractions due to increase in rationing by banks. The main issuers of this trade credit are a subset of large firms, in particular those with a good credit rating. Marotta (1997) performs a similar analysis on a sample of Italian firms and shows that trade credit partially absorbs the effects of a

monetary contraction on small firms. However, despite this offsetting mechanism there is still an impact of such contractions on credit constrained firms. Kohler, Britton and Yates (2000) use aggregate data and a sample of UK firms to show that big firms provide extra finance to small ones in periods when there is a recession or the monetary policy tightens.

Along these lines, Boissay and Gropp (2007) explore the transmission of liquidity shocks through chains of sellers and buyers using a sample of French firms. Firms that suffer from idiosyncratic liquidity shocks are more likely to default on trade credit. Credit constrained firms pass more than one fourth of the liquidity shocks they face on to their suppliers down the trade credit chain receiving implicitly liquidity insurance. The mean amount of quarterly default is 2% of total assets on an annual basis. For some firms (the top 1% tail) defaults represent above 8 percent of total assets. The presence of deep pocket firms in a long chain of suppliers and sellers can act as an insurance device for all the firms in the chain. The structure of trade credit contracts and the price of goods should guarantee that such insurers get compensated.

Overall trade credit seems to serve as a means of liquidity insurance across firms. This is particularly the case when shocks are idiosyncratic and liquidity is not scarce on the aggregate. However in macroeconomic downturns or monetary contractions this mechanism, although dampened by the aggregate conditions, is still present. Trade credit partially absorbs the individual liquidity squeezes given that firms with better access to financial markets are able to extend it.

Liquidity, transaction costs and inventory management

A major role of trade credit is to facilitate transactions by providing immediate short-term liquidity when goods are delivered (Ferris, 1981). This is an obvious function of trade credit insofar its contractual design seems to be tailored for this purposes. The common two-part contract contains a portion of credit without an explicit financial cost that helps firms with reducing working capital needs. The second part of a two-part contract can also be used as a means of immediate liquidity, although its explicit financial cost makes

it more similar to a standard short-term credit. Daripa and Nielsen (2005) argue that the structure of trade credit is particularly well suited to induce firms to take inventory risks. These are first order effects and even firms with good access to more advantageous lending use trade credit as a way to smooth transactions.

The need to extend trade credit to customers as a way of easing transactions may generate a large burden in terms of working capital of the sellers. The existence of factoring contracts and discount lines in banks helps to alleviate this cost. Factoring and discount lines allow buyers to use trade credit as collateral to get bank loans. When using a factoring contract the buyer is effectively being paid early. This is quite a special type of contract given that the collateral pledged is often in itself a type of contract with little collateral value. There is also a related puzzle regarding seniority, given that accounts receivable are often used as collateral for more senior bank debt (Longhofer and Santos 2003). Interestingly, there is a whole range of types of factoring contract depending on how much of the risk of not getting paid is transferred to the bank and how much stays with the seller.

Along these lines the optimal policy with respect to how much trade credit to give and to take is far from obvious. The common wisdom of “pay late, get paid early” does not necessarily hold once the implicit cost of trade credit is taken into account. Concentrating only on the explicit cost, the maxim of “pay late, get paid early” should only be used whenever trade credit does not carry an implicit cost, while the reverse should be the optimal policy whenever trade credit does have an implicit (large) cost. However, as mentioned above, this cost may be higher or lower depending on whether the price of goods already incorporates an expected cost of trade credit. In those cases where trade credit does not carry an explicit cost it is only the cost embedded in the price of goods the one that determines the cost of trade credit, but even when the cost of trade credit is explicit, if different prices are offered to customers that regularly pay early with respect to those that regularly use trade credit, this has to be factored in.

The bargaining over the price of goods and trade credit is particularly interesting in the case of large purchasers such as big retail chains. Large buyers often receive very advantageous trade credit terms from small sellers. These good terms are often attributed to the strong bargaining power that these large buyers have. However it seems inefficient that small and probably financially constrained firms finance larger firms with better access to financial markets. One possible explanation for this apparent puzzle is that, in fact, large retailers have very large leverage ratios and on the margin, they may be as financially constrained as the small (and less leveraged) sellers that fund them. Another potential explanation is that this is an effect of the large bargaining power of large buyers. However, if this was the case, it seems that it would be more advantageous to bargain for even lower prices and not to get trade credit from constrained sellers.

Conclusions

In this chapter, we have discussed several features of trade credit that make it a unique type of corporate debt. Fundamentally, trade credit is a debt commitment linked to the purchase of a good. As such, the commercial relationship between buyers and suppliers, as well as the characteristics of the traded good, play a crucial role in determining its existence, its cost, and how the contract is enforced.

Being able to receive trade credit helps firms manage their liquidity needs. Perhaps more importantly, it enables small entrepreneurial firms to obtain financing in situations where other forms of credit are not available, thus alleviating the impact of financing constraints. Trade credit can also act as a liquidity buffer if the firm suffers temporary liquidity shocks and may help smoothing the economic downturns

The possibility to issue trade credit is a useful mechanism to boost sales and to screen customers. It also allows suppliers to act as financial intermediaries whenever they have better access to financial markets than their customers.

The indivisibility of interest rates and prices makes it hard for an outsider to determine the cost of trade credit and the optimal firm policy in terms of trade credit given and taken. However, firms should be able to assess the elasticity of prices to their borrowing and lending practices and optimize their trade credit use accordingly.

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Author	Data Source	Objective(s) of paper	Method and main variables analyzed	Focus	Main findings	Theories supported
Nadiri (1969)	Quarterly aggregate balance sheet data of US manufacturing firms (Quarterly Financial Report), 1945-1964	Test theoretical model: Quantity and price of trade credit is determined optimally by firms to minimize costs	OLS regressions for: AP, AR, and net TC	TC OFFERED TC TAKEN NET TC	AP, AR, and net TC are highly responsive to changes in cost of trade credit. Changes in money supply affect AP and AR, but not N	TC is used as tool for cost minimization
Ellehausen and Wolken (1993)	Balance sheet data of US small non-financial firms (SSBF), 1987	Test whether data support transactions cost or asymmetric information theories	Probit regressions for use of trade credit Logit regression for late payment of TC Regression for AP	TC TAKEN	Use of trade credit and proportion of accounts payable is related to the volume of purchases and to greater variability in the timing of delivery contracts Riskiest firms use more TC and pay more TC late	Transactions costs and asymmetric information
Petersen and Rajan (1997)	Balance sheet data of US small non-financial firms (SSBF), 1993	Test which theories of trade credit find most support in the data	Simultaneous equation model for AR and AP	TC TAKEN TC OFFERED	More creditworthy, less rationed firms offer more credit Firms with higher profit margins offer more credit Firms facing financial difficulties offer more credit Firms with substitute sources of credit use less TC	Information asymmetries in general. To lesser extent, also imperfect market competition
Ng, Smith and Smith (1999)	Ad-hoc survey on a sample of COMPUSTAT firms	Examine empirically the trade credit policy of supplier firms	Several logit models for the choice of TC policy and contract terms	TC OFFERED (CONTRACT AND TERMS)	Variation in credit terms is large across industries but limited within industries Suppliers do not adjust credit terms to respond to changes in demand or in inventory. Reputable sellers more likely to offer two-term than net TC, reputable buyers are offered more credit	Information asymmetries in general, and in particular in product quality
Nilsen (2002)	Quarterly aggregate balance sheet data of US firms (Quarterly	Investigate the role of TC within the bank lending channel of monetary	Vector Autoregressive Models for AP, inventory, and	TC TAKEN	Small firms increase TC use during monetary contractions Among large, only unrated	Bank lending channel of

	Financial Report), COMPUSTAT balance sheet data	policy transmission	liquidity along with macro variables; Time-series regressions for TC		firms increase TC use during contractions	monetary policy transmission
Cuñat (2007)	Account information for UK manufacturing, retail and wholesale firms (FAME), 1993-2002	Test theoretical model: Commercial ties between firms implies (i) suppliers are better able than banks to enforce non-collateralized debt repayment, and (ii) suppliers provide liquidity to clients with temporary difficulties	Parametric and non- parametric regressions for the ratios of trade credit to assets and trade credit to debt	TC TAKEN	Levels of trade credit build up as the supplier-borrower relationship evolves. Levels of trade credit are higher when firms experience liquidity shocks.	Information asymmetries and moral hazard in repayment
Garcia- Appendini (2007)	Balance sheet data of US small non- financial firms (SSBF), 1998	Test whether suppliers have an information advantage over banks	IV and probit regressions on the offering/denial of bank credit on TC use, TC denial, discount use and payment behavior	TC OFFERED	Conditional on being ex-ante relatively uninformed, banks provide more credit to opaque firms that have been granted TC by suppliers Firms that have been denied TC are usually also denied bank credit	Information advantage of suppliers over banks

Burkart, Ellingsen and Giannetti (2009)	Balance sheet data of US small non-financial firms (SSBF), 1998	Test which theories of trade credit find most support in the data, taking into account product characteristics and the trade credit contract	OLS / probit regressions for TC offered / denied, TC taken and payment behavior. Selection-adjusted regressions for TC contract terms.	TC OFFERED, TC TAKEN, TC CONTRACT, PAYMENT BEHAVIOR	TC use is related to the product characteristic of the traded good Firms using TC borrow from banks that are relatively more uninformed TC borrowing is relatively cheap.	Information asymmetries: moral hazard in repayment, information advantage of suppliers over banks
Fabbri and Klapper (2009)	Firm-level data and survey responses of Chinese small and medium firms, 2003	Understand empirically the simultaneous decision to offer and take TC	Several regression models for TC taken and terms received, and TC offered and terms given	TC OFFERED AND TAKEN	Firms facing stronger product market competition extend more TC TC taken from suppliers is likely to be used to finance customers through TC TC terms received/offered are generally matched	TC used to foster sales

Abbreviations used: TC=trade credit, AR=Accounts receivable, AP=Accounts payable, AICPA=American Institute of Certified Public Accountants