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TRADE CREDIT IN KENYAN MANUFACTURING
Evidence from plant-level data

Anders Isaksson

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Statistics and Information Networks Branch of UNIDO

The author is a staff member of the United Nations Industrial Development Organization (UNIDO), Investment Promotion and Institutional Capacity Building Division, Statistics and Information Networks Branch (correspondence to aisaksson@unido.org). The author thanks Helmut Forstner, Thiam-Hee Ng and Ghislain Robyn for careful reading and excellent suggestions. The views expressed in the paper are those of the author and not necessarily those of UNIDO or its member states.

Abstract: Panel-data of Kenyan manufacturing firms collected between 1993-95 indicate that trade credit constitutes a significant portion of such firms' external financing. Regression analysis points out firm size, firms being formal, demand, debt position, promotional activities, and educational level of firms to be important determinants of access to trade credit. Ethnic origin, argued to be an important explanatory variable in previous research on trade credit in African manufacturing, is shown to be of little relevance for the likelihood of obtaining trade credit. Concerning advance payment, it seems that Asian-owned firms and relatively indebted firms have less interest in requiring such credit.

Keywords: Trade Credit, Advance Payment, External finance, Kenya, Manufacturing sector

JEL Classification: G30; G32; O16; O17

1. Introduction

Trade credit is an essential element of business life for most firms in the world, so important that it even has macroeconomic repercussions.^{1,2} One may imagine that trade credit is even more important in countries where financial markets malfunction, contract enforcement is insecure, and information is scarce, unreliable, and asymmetric.³ Many Sub-Saharan African (SSA) economies may be described in such a way. Ultimately, conditions like those impair manufacturing firms' abilities to efficiently function, invest, and grow. In turn, the manufacturing sector's growth and ability to drive overall economic development is hindered.

In a financially inefficient working environment, firms may have to seek alternative sources of external financing and trade credit constitutes such an alternative. Despite the potential importance of trade credit, limited attention has been paid to its role and use, especially in developing countries.

The present paper seeks to help address this lack of attention by focusing on the importance of trade credit in Kenyan manufacturing. The questions addressed in this paper are the following: First, is trade credit a marginal incidence in the debt portfolios of African firms, or does trade credit constitute a serious alternative to more "common" external financing? Second, what are the determinants of access to trade credit? Third, is it possible that trade credit can substitute for access to formal finance if the latter is constrained?

These questions are complicated by the fact that apart from lack of external finance there are several other justifications for trade credit financing. Examples are the verification motive, promotion and simplification of transactions. Furthermore, there are grounds to believe that trade credit is more efficient and more easily available as a source of external finance. The reason is that suppliers have several cost advantages over financial institutions in providing credit: First, the trading relationship gives suppliers an informational advantage over financial institutions; Second, in the case of breach of

¹ For instance, in 1986 accounts receivable accounted for 21 per cent of US manufacturing firms' total assets (Mian and Smith, 1992). In 1995 accounts payable accounted for 12 per cent of Belgian firms' total liabilities (Deloof and Jegers, 1999). Between 1989-1997, trade credit as a share of total assets was 25 per cent in Italy, 23 per cent in Spain, 20 per cent in France, but only 7 per cent in Germany (Marotta, 2000). Johnson, McMillan and Woodruff (2002) show that trade credit is an important source of capital in Poland (2.7 per cent of annual sales) and Slovakia (3.4 per cent), but less so in Russia (almost non-existent) and Ukraine (0.7 per cent). As will be shown in this paper, trade credit is at least as important in Kenya as in the US, the Western Europe and parts of the Eastern Europe.

² Kohler, Britton, and Yates (2000) show that there is a "trade credit channel" that offsets the "bank credit channel" of monetary policy.

contract the supplier can seize the supplied goods; Third, repeated interactions allow the supplier better control of the buyer's actions and; Fourth, large firms can act as financial intermediaries for small firms that have comparatively poor access to external financing (Schwartz, 1974).

This paper extends previous work on trade credit in SSA in several ways. First, whereas previous studies have been limited by lack of data and based on cross-section analysis solely, this paper takes the advantage of having access to a 3-year panel of Kenyan manufacturing firms. Second, previous studies tended to focus only on very few determinants, while both economic theory and the surveys themselves suggest many explanatory variables. In this paper, therefore, a more detailed view on access to trade credit can be provided. Finally, the paper is not only concerned with access to trade credit, but also with access to advance payment from clients.

Previous empirical studies have indicated that trade credit constitutes an important share in the debt portfolio of African firms (e.g. Cuevas et. al, 1993). The results obtained here support that view. Another view shared with other studies is that firm size is an important determinant for access to trade credit. However, previous evidence that African entrepreneurs are discriminated against finds no support here. The reason for the non-discrimination result obtained here stems most probably from the inclusion of relevant explanatory variables that in previous research may have been captured by the variable of African ownership status. Other important determinants of access to trade credit are the formal status of the firm, short- and long-term debt, promotion, and overall demand conditions facing the firm.

Regarding advance payment, regression analysis suggests profit, short-term debt, skill, and Asian ownership to be candidates for explanatory variables. Since previous work seems to have largely overlooked the incidence of advance payment, comparisons with other research is not possible. The neglect of advance payment is unfortunate because for informal firms such credit is the single most important item in their debt portfolios.

The rest of the paper is organised as follows: in Section 2 the motives behind the existence of trade credit are discussed and previous empirical results pertaining to SSA countries are reviewed. The data used in the empirical analysis are described in some detail in Section 3 and the firms' debt portfolios are presented along with evidence on the use of trade credit. Section 4 presents the

³ For instance, Fisman and Love (2001) find that firms in industries with higher rates of trade credit grow faster in countries with relatively weak financial institutions.

determinants of trade credit and advance payment obtained from regression analysis. Section 5 states some conclusions.

2. Theory and previous results

2.1 Theoretical underpinnings

Trade credit can be defined as the purchase of goods or services that involves delivery of goods or services at a certain date with payment at a later date. One version is that of suppliers delivering goods to clients more or less continuously, with payment for a certain period, say a month, occurring once a month. Usually the invoice is for the total value of monthly deliveries and there is a set time to pay.

There are many versions of trade credit contracts. For instance, some contracts may involve a cash discount, while others entail different kinds of promises. Trade credit also includes instances wherein the firm has obtained goods and pays later (trade credit received from the supplier). Other cases of trade credit occur when the firm delivers goods and allows the client to pay at a later date (trade credit extended to the client), when the firm has paid in advance for goods to be delivered later (advance payment extended to the supplier), or when the firm has obtained payment in advance for goods to be delivered later (advance payment received from the client). The present paper is concerned with trade credit and advance payment received.⁴

Trade credit can be justified by the following five motives: the transaction motive, the pricing motive, the financial motive, the sales-promotion motive, and the verification motive. The *transaction motive* rests on the simplification of payment induced by trade credit. It is convenient for both the supplier and the client to combine deliveries into a single periodic invoice. Trade credit as well as advance payment then turn out to be part of inventory decisions (Ferris, 1981).

When the supplier uses credit terms in order to discriminate among clients, the *pricing motive* is a relevant explanation for trade credit. The importance of this motive, however, seems minor and may have to be reckoned with only when there are large purchases. In that case, the credit operates like a quantity discount (Brennan, Maksimovic, and Zechner, 1988).

If the supplier of goods has better access to finance than the client has, or when the client hesitates to use the limited finance it can access in order to finance inventories, trade credit can be

⁴ Trade credit and advance payment extended will be examined in a forthcoming paper.

financially motivated (also called the liquidity motive). If, for instance, a large firm has better access to external financing than its smaller counterparts, then trade credit may flow from large firms to small firms. That is, large firms act as financial intermediaries. The reason why large firms would want to grant credit to small firms can be found in the process of sale. Suppliers learn about the clients' behaviour through repeated interaction and they also have the power to withhold deliveries in case of late or no payment.⁵

The *sales-promotion motive* (Nadiri, 1969) rests on two arguments; first, a supplier may want to offload some of his excess inventories onto clients. To be able to persuade the clients of the idea (to transfer costs of inventory onto the clients) the supplier may allow for later payment. Furthermore, suppliers may allow for trade credit to gain a competitive edge over competitors.

Finally, there is the *verification motive*, which simply means that the client needs time to verify the quality and quantity of the goods delivered before paying for the goods (Smith, 1987). Verification is relevant also in the case of trade credit extension. Long, Malitz, and Ravid (1993) find that small firms and firms producing goods of quality which take longer to assess may extend more trade credit. These results point to the importance of asymmetric information, not only about the firms, but also about their products.

Frank and Maksimovic (1998) provide interesting work on trade credit issues. In their model there are three actors: the seller, the buyer and an investor, which provides financing to fund the timing gap between payment and delivery of the goods. The authors show that the seller's provision of trade credit depends on the creditworthiness of the seller itself. They stress that, in equilibrium and considering sales that are expected to be profitable, full trade credit will be extended to less creditworthy clients. The more creditworthy clients will only receive partial trade credit. This somewhat surprising result takes place because the less creditworthy firm is more likely to default. When default occurs the seller has an information advantage over investors concerning reclaiming the value of the goods (than is the investor).

⁵ Furthermore, suppliers may have a comparative advantage in obtaining information about clients at relatively low cost, better ability to liquidate goods, and a greater implicit equity stake in a client's long-term survival (Peterson and Rajan, 1997; Frank and Maksimovic, 1998).

Ideas of how and under what circumstances a contract between a supplier and a client is agreed upon can be drawn from contract theory.⁶ A client's willingness to comply with a contract depends crucially on various enforcement mechanisms that penalise breach of contract. These mechanisms may be based on honesty, coercion, or repeated interaction. Honesty depends on many sociological factors, such as a client's upbringing, religion, and cultural values. Coercion can be legal or illegal. Legal action means that breach of contract can be taken to court and that creditors can seize a debtor's asset(s). When jurisdiction works improperly or cannot be trusted, or when property rights cannot be secured, collateral loses its value. In that case, coercion may take illegal forms and contracts may be self-enforced. In its extreme, there may be violence involved, but often threat is enough. Threats in themselves, however, carry their own costs and for small loans it may not be worth turning threats into action. In such a case the threat is not credible and the contract is not likely to be complied with.

Repeated interaction is another useful enforcement mechanism. It can involve a supplier that stops delivering goods in the case of non-compliance with a contract, but it can also be a group of suppliers that have exchanged information about a client's unwillingness to comply with a contract. Reputation, if it is accurate and can be verified, may work as a co-ordination and information-sharing device.⁷ However, this form of enforcement mechanism is effective only when the relationship is worth preserving.

Here some features of a general theoretical 'model' that underlies the subsequent empirical analysis is presented: consider two time periods, 1 and 2. The supplier promises to deliver quantity Q of goods in time 1 in exchange for payment P of money from the client in time 2. In case of advance payment, Q and P can be interchanged with one another. At time 2, the client decides whether or not he will comply with the contract. This decision is assumed to vary with the type of client (e.g. relative skill-levels, good reputation versus bad reputation, and relative firm size).

The supplier can affect the probability of repayment by influencing how contract C is formed (e.g. requiring that client sell assets to service the debt in case he goes bankrupt). Such an arrangement does not come without 'cost', however. For instance, since repeated interaction often works well in commercial trade, only a limited use of formal guarantees and the court system is anticipated.

⁶ Hart (1995) is an excellent source for models based on contract theory. Fafchamps, Pender, and Robinson (1995) present such a model in the case of trade credit and the rest of this section draws from that paper. Other good sources are Hart and Holmström (1987) and Kreps (1990).

⁷ Ng, Smith, and Smith (1999) find support for the importance of reputation in extending trade credit.

Imperfect contract enforcement can result in rationing if, for all possible contractual forms, the net value of the transaction is negative. Large anonymous transactions can be expected to be carried out by legal institutions that are able to provide collateral, while small anonymous transactions can be expected to be self-liquidating, with, for instance, immediate cash payment.

Relevant explanatory variables for the subsequent empirical analysis would relate to the type of client, to various contract enforcement mechanisms, but also to general business conditions such as the overall demand situation facing the firms. Yet another source of explanatory variables are found in previous studies, and the next section reviews studies that have analysed the use of trade credit in SSA countries.

2.2 Review of previous studies⁸

This section summarises the main results obtained from studies on the use of trade credit in SSA countries. Common to all the studies reviewed here is that they only have one year of data and hence, they are confined to cross-section analysis. In contrast, the present study thus has the advantage of being based on a three-year panel and employing panel-data methods in its analysis. In this way both cross-section variation and variation over time is taken into account simultaneously.

A second limitation of previous studies is the meagre use made of the survey data to create explanatory variables. The lack of explanatory variables, in turn, makes discrimination between firm size effects and, say, promotion or formal status of the firm impossible. Therefore, there may be a tendency in previous studies to overestimate the association between, for instance, access to trade credit and firm size, or trade credit and ethnic origin of the firm owner. Furthermore, economic theory suggests a large number of possible regressors for financial topics, a wealth that has largely remained unexplored so far.

All the studies reviewed here use data collected within the framework of the World Bank's Regional Programme of Enterprise Development (RPED), which was undertaken in several SSA countries between 1991-95. In addition to the broad surveys, case studies were carried out in a few selected countries. The case studies, which only cover a sub-sample of the entire RPED dataset,

⁸ Examples of studies focused on non-African countries are Peterson and Rajan (1997) using US data and Crawford (1992a) on UK data. Crawford (1992b) provides a comprehensive survey of the trade credit literature and also contains summaries of a number of empirical studies.

allowed the interviewers to ask in-depth questions about, among several issues, trade credit. The present study does not have access to data from the case studies, but since the case studies cover only one year this limited time dimension in any case would diminish their usefulness for the present study.

The study by Biggs *et al* (1996) seeks to identify the determinants of access to trade credit using the first survey year (1993) of the Kenyan RPED data. In a Probit model they find that access to trade credit increases with firm size and that it is positively influenced by the owner being of Asian origin. Another finding is that Asian owners have better access to trade credit than African owners, and only relatively large African firms seem to have access to trade credit.

Biggs *et al* (1994) focus on enterprise finance in Kenya at large and have a section on trade credit. The data used are those of the first round of the Kenyan RPED survey together with a case study. They confirm the above finding that the use of trade credit increases with firm size. Advance payment by clients, on the other hand, appears to be more frequent among relatively small firms. Asian entrepreneurs appear to use trade credit preferably compared with their African counterparts. The ratios of various forms of trade credit to sales are below 10 per cent, except for trade credit provided, which climbs to 17 per cent at most (for medium-sized firms). A Tobit regression on the proportion of suppliers extending credit shows that African-owned firms obtain trade credit from a smaller proportion of suppliers than do ethnic groups. Another Tobit regression reveals that African-owned firms rely less on trade credit for purchases, while relatively large firms tend to rely more on using such credit.

Cuevas *et al* (1993) study enterprise finance in Ghana. Their basic finding is that trade credit is the most important source of external financing for small firms. However, trade credit is also of significant importance for larger establishments. This result leads the authors to draw the following policy conclusion: targeting criteria should take into account the market structure of the industries in question. The program should focus on those sectors where trade credit is used extensively or where it offers significant growth potential. Attention is thus turned away from making formal credit more accessible to small firms to making trade credit at large more easily available.

For Zimbabwean firms, Fafchamps, Pender, and Robinson (1995) found that larger firms were more likely to obtain trade credit. African-owned firms were less likely to do so. Firm size and the status of being subsidiaries had a positive effect on the proportion of total purchases on credit, while having an African owner had a negative effect. The authors also provide evidence that some screening

is done purely on the basis of the ethnicity of the applicant, with African owners more likely to be screened. An explanation provided is that African owners are liquidity-constrained. Large firms are more likely to obtain credit on the first purchase, suggesting that reputation is used as a screening device.

Fafchamps (1997) deals with trade credit in Zimbabwean manufacturing using both RPED and case study data. Probit regressions show that large firms and non-African owned firms are more likely to obtain trade credit. Africans are discriminated against, independent of firm size. Moreover, the author finds that large firms purchase more on credit than do smaller firms. African-owned firms and other non-White firms buy less on credit compared with White firms (the author's classification of ethnicity). The reason why trade credit is used at all is that it improves the firms' ability to manage their cash flow, but there is some evidence for White firms that there are other reasons as well. This may indicate that White firms are less liquidity-constrained than non-White firms. Micro and small firms also appear to self-ration because they fear that a cash-flow shock may reduce their ability to repay and eventually lead to default.

Fafchamps (2000) focuses on the importance of ethnicity for trade credit and bank credit in Zimbabwe and Kenya. Since the present paper centres exclusively on trade credit, his results on bank credit will not be discussed. The data at hand are not the large RPED surveys, but the two limited case studies undertaken in Kenya and Zimbabwe. Descriptive analysis reveals that African owners are more likely to be outside the main business network, while multivariate analysis shows that ethnicity is an obstacle for access to trade credit. Furthermore, African-owned firms tend to receive contracts with shorter duration compared with their non-African counterparts. Partly, network effects can account for this. However, other trade credit terms appear unaffected by ethnic origin. Another interesting result is that trade credit is more prevalent in Zimbabwe than in Kenya, which is explained by the existence of a formal credit reference bureau in Zimbabwe.

This short but fairly thorough survey of trade credit in SSA countries has highlighted the importance of firm size and ethnicity as determinants of access to trade credit. As regards ethnicity considerations, it seems unclear whether these are racist tendencies or statistical discrimination. But it will be shown in this paper that the importance of ethnicity in determining trade-credit access appears exaggerated. Another drawback is that the number of explanatory variables included in the regressions is small, while at the same time economic theory and the wealth of firm characteristics documented in

the surveys suggests rich possibilities for more detailed statistical work. The results from Probit and Tobit estimations only show the estimated parameters without evaluating the marginal effects. For that reason, it will be difficult in this paper to compare economic magnitudes, in terms of size of the marginal effects obtained, with those of previous research.⁹ This issue is further complicated by the fact that the present paper reports a panel-data analysis. Nevertheless, comparisons of signs as well as of which parameters are significant or not in a statistical sense are feasible.

3. Descriptive analysis

3.1 Data description

The data used in this paper constitute a comprehensive set of panel data on a sample of firms within the Kenyan manufacturing sector. The data were collected over the period 1993 to 1995 in three annual surveys in the context of a World Bank research project called RPED.¹⁰

The dataset covers more than 200 firms from four industrial sub-sectors: food, wood, textile, and metal. These sectors were selected because they were perceived to have the greatest likelihood of exporting. The firms are located in four major cities of Kenya: Nairobi, Mombasa, Nakuru, and Eldoret and range from micro-firms to multinationals. While the majority of the firms are formal, there is also a considerable proportion of informal ones. Detailed information about the data can be obtained in Aguilar and Bigsten (2001), who discuss the data collection and sampling procedure.

3.2 Results from the descriptive analysis

Table 1 presents the relative importance of different sources of external finance by, first, firm status (formal or informal). Thereafter, firms with a formal status are further divided into sub-groups based on ethnic origin of owners and firm size. The figures in the table are mean and median values, with the

⁹ The work by Biggs *et al* (1996) is an exception in this respect.

¹⁰ The years covered by the data are not always obvious. While questions about outputs and inputs clearly refer to “last year”, questions about finance are about “current outstanding balance”. For that reason there is certainly a mix of years in the data and when explaining outstanding debt by sales it is the case that this year’s debt is explained by last year’s sales. This is not entirely negative because potential problems with endogeneity bias are to some extent rectified in this way. Since current outstanding debt is the focus of this paper it seems reasonable to refer to the years when the interviews were undertaken.

latter presented in parentheses. Only figures for which there are data for all categories and for all three years are presented.¹¹

Focusing solely on trade credit, it can be seen that, of the total loan portfolio, “trade credit owed to suppliers” constitutes about a third of the portfolio for formal firms, and almost 20 per cent for informal ones. Informal firms are large on “trade credit owed to clients” (i.e. advance payment), which takes up about half of their loan portfolios. The corresponding number for formal firms is only 6.5 per cent. This result indicates that supplier credit is scarce for informal firms, and that they often need to require prepayment from clients. Such numbers may also suggest that informal firms are so financially constrained that they cannot produce without first requiring advance payment to buy, for instance, raw materials.

Among formal firms, supplier credit accounts for up to between 32-37 per cent of the loan portfolio for small, medium, and large firms, while microenterprises face the same difficulties as the informal firms. Concerning advance payment, again, microenterprises seem to be in the same position as informal firms. Across ethnicity, the differences are less pronounced, although non-African and non-Asian-owned firms borrow almost twice as much in the form of trade credit compared with African-owned firms. However, the trade credit shares are fairly high for all ethnic groups, ranging from 26 per cent for Africans to 43 per cent for “other ethnic groups”. These results are thus largely consistent with the literature review in the previous section.

Table 2 shows the frequency of using various sources of external finance across firm status, ethnic origin, and firm size, where again the latter two designations refer to formal firms alone. Approximately 60 per cent of the formal firms, and 16 per cent of the informal ones, have used trade credit for financing. Across firm size, incidence of trade credit is more than 50 per cent for small, medium, and large companies. Obtaining trade credit appears easier for Asians and other non-Africans. Informal firms tend to require advance payment more often than formal firms do. Of the informal firms, 40 per cent have used advance payment, while the corresponding figure for formal firms is 20 per cent. The incidence of advance payment seems to fall with firm size. Moreover, such credit appears rare among Asian owners (15 per cent), but is quite common among non-African and non-Asian

¹¹ This explains why the number of observations in Table 1 is less than the total number of observations available.

owners. Without doubt, trade credit constitutes an important part of the (mean) portfolios of Kenyan manufacturing firms, particularly for formal firms of some size.

4. Regression analysis

The previous section strongly pointed to the importance of firm status and firm size as explanatory factors for access to trade credit from suppliers and demand for advance payment from clients. There was also support for the idea that ethnic origin of the firm owner could matter. However, it is clear that these two firm characteristics may proxy for other factors (e.g. reputation and other debt) that might influence such access and demand. Clarification on this and other points can be expected only from multivariate analysis.

4.1 The dependent variables

The variables to be explained are the probability of a firm having obtained trade credit/advance payment and the amount of trade credit/advance payment obtained. The dependent variable in the first case is dichotomous, with unity if the firms have a positive outstanding balance of trade credit/advance payment and zero otherwise. As regards the amount of trade credit/advance payment obtained, the dependent variable is measured by the outstanding balance of trade credit/advance payment as a share of total external finance.

4.2 The explanatory variables

The explanatory variables are drawn from the theoretical discussion as well as from the empirical studies reviewed in section 2. Relevant variables would then proxy for factors such as enforcement mechanisms, reputation, future and current repayment ability, information, but also for firm characteristics like ethnic origin of the owner and firm size as well as overall demand conditions.

In the way hypotheses are described in this section, there is an obvious trade credit bias. Since theory does not have much to say about advance payment, such a bias has to be accepted. The trade credit discussion is viewed mainly from the supplier's side, although it is not easy to disentangle demand and supply considerations. For advance payment, the view taken here is that the variables chosen govern the demand for advance payment; they do not have much to say about the client's

willingness to provide credit, that is, to pay in advance. Overall, the proposition is that the same determinants that apply for the probability of obtaining trade credit/demanding advance payment also apply for the amount of trade credit received/advance payment required.

It is hypothesised that *firm age* (the natural logarithm of years of age +1) is positively correlated with access to trade credit because older firms may have established good relations and reputation with suppliers and clients. *Firm age* may also proxy for repayment ability because firms that have been in business for a long time may have acquired knowledge, which increases profitability and survival prospects. In the absence of effective legal enforcement, start-up firms and relatively young firms may find it more difficult to obtain trade-credit financing (Fisman and Love, 2001). As regards advance payment, a long-standing relationship ought to reduce the demand for advance payment. Another reason for a negative relation between advance payment and *firm age* is that relatively young firms may require more payment in advance.

Firms spending resources on *promotion* (promotion as a share of sales) have incentives to fulfil promises and obligations so as to preserve reputation. Promotion could also proxy for brand name and firms with a strong brand name have more to lose from renegeing on a contract. Promotion can therefore be seen as an investment in reputation and is expected to have a positive effect on obtaining trade credit. The role of *promotion* for advance payment is unclear, but it is possible that not demanding prepayment in some circumstances could work as *promotion*.

The educational level of the staff (the number of white-collar workers as a proportion of the total labour force) signals ability (e.g. managerial ability) and may improve repayment ability. This variable may also proxy for product-differentiation, which would reduce risk and thereby increase the possibility of external financing. The association with advance payment is most likely negative, since there is less risk for a firm with skilled staff to face financial trouble. Hence, the need for advance payment is reduced.

Firm size (the natural logarithm of sales +1) may play several roles. First, relatively large firms have more to lose in terms of reputation in case of breach of contract. Second, smaller firms are more vulnerable to risk and thus constitute a greater risk to the supplier. Third, larger firms may have more social capital at stake, which means that their reputation can be used as an enforcement mechanism. Fourth, one may also expect large firms to exert their market power. That is, losing a large customer could prove costly to the supplier. Fifth, asymmetric information considerations are reduced for larger

firms because there is more public information available. Hence, *firm size* is expected to relate positively to trade credit.¹² Concerning advance payment, larger firms are in less need of such credit.

Firm status plays the role of an informational variable (a dummy variable equal to one for formal firms and zero otherwise) in that licensing of the firm automatically brings about a certain information flow. For instance, formal firms, as opposed to informal ones, are expected to have greater access to trade credit because of better repayment ability and their being subject to legal enforcement in case of breach of contract. Thus, for such firms more is at stake and they are expected to signal relatively low risk. Given the informal firms' precarious situation, they may require advance payment to even be able to manufacture the demanded products.

The review of previous studies indicated that ethnic considerations could be of importance. Ethnicity is divided into three dummy variables: 1) Firms with *African* owners (dummy with unity for African-owned firms and zero otherwise); 2) Firms with *Asian* owners (dummy with unity for Asian-owned firms and zero otherwise); and 3) all others (mainly owners from Europe and the Middle East), which constitute the reference group.

Based on previous research, access to trade credit is hypothesised to be lower for *African* owners than for the two other ethnic groups. There may be several reasons for this. First, *African* owners may be subject to statistical discrimination, i.e. perceived as a group by suppliers to be less reliable in repaying credit. This may be the case because *African* owners receive less credit in the first place and, therefore, have fewer possibilities to smooth cash-flow fluctuations. Second, straight-out racial discrimination cannot be excluded beforehand. Third, there may be differences among ethnic groups with respect to socialisation behaviour. If there exist network effects, these should affect the likelihood of obtaining supplier credit. Fourth, Africans probably trade more with other Africans than with other ethnic groups. Presumably, African clients as a group are poorer and are therefore perceived as riskier debtors than Asians and other non-Africans.

Asian owners are expected not to be subject to racism (or at least subject to less racism) or statistical discrimination. A positive sign of the parameter for Asian owners is, therefore, expected. Since informal and micro firms are mainly *African*-owned, it can be expected that *Africans* to a larger

¹² Note that growth opportunities may be proxied by *firm size*, in which case growth opportunities are thought to decline with *firm size*. If this effect is important, smaller firms can be expected to have better access to trade credit. On balance, however, this effect is unlikely to dominate the ones driving a positive relation between *firm size* and trade credit.

extent demand advance payment. *Asian owners*, on the other hand, tend to own relatively large and formal firms and a negative association with advance payment is therefore hypothesised. But, to repeat: Ethnicity could be an unimportant factor when controlling for variables that correlate with it.

Profit (gross profit per employee) is thought to capture the ability to generate cash-flow. Hence, profitable firms will acquire trade credit more easily. However, if there is a pecking-order behaviour involved in firms' financing, it can be expected that firms prioritise internal funding (Myers, 1984). In the case of pecking-order behaviour, demand for trade credit would, *ceteris paribus*, be lower for highly profitable firms. If so, the parameter of the profit variable may enter with a negative sign in the regression. Hence, a priori, the sign of the *profit* parameter is uncertain. A negative sign can be expected for the parameter of profit in the advance-payment regression, since profitable firms should be in less demand of such credit.

A matching approach to firm financing suggests that short-term needs are funded with short-term funds and that long-term needs are funded with long-term funds. It is therefore possible that short-term debt substitutes for trade credit. For that reason *short-term debt* (measured as the proportion of *overdraft facilities* as a share of total debt) is included. Although a matching hypothesis would not suggest long-term debt to substitute for short-term debt, such as trade credit, there is some empirical evidence that trade credit and long-term debt indeed are substitutes (Deloof and Jegers, 1999). Hence, the proportion of *long-term debt* as a share of total debt is also included in the regression.

Negative parameters for *short-term debt* and *long-term debt* would be interpreted as such substitutions. Note that a "high-risk interpretation" of *debt* would also produce a negative coefficient for trade credit, but for other reasons than matching. On the other hand, the level of the outstanding stock of *debt* could signal that a firm is creditworthy. In this sense it constitutes favourable information about the firm and positive signs of the parameters of the *debt* variables can be rationalised as well.

It is unclear what relation *debt* has with advance payment. If advance payment is viewed as any short-term funding then the matching-hypothesis may apply here as well. Indebtedness could also indicate financial problems and a firm with such problems would require advance payment to a larger degree than firms with less financial problems. The first interpretation suggests a positively signed parameter, while the second one proposes a negative sign.

Firms with *tangible assets*, here defined as the replacement value of capital as a share of total assets, are thought to have better access to trade credit compared with firms that lack such assets. The

reason is that such assets can legally be pledged as collateral. Furthermore, such assets can be acquired in case of self-enforcement of contracts. Tangible assets are not included in the advance payment regressions, since such an inclusion cannot be motivated.

The level of capacity utilisation, where larger numbers indicate lower capacity utilisation, captures the overall *demand situation* of a firm's products.¹³ A high degree of slack demand should be inversely related to chances of obtaining credit, but is expected to positively associate with advance payment. By contrast, the model of Frank and Maksimovic (1998) suggests that sellers would extend more trade credit to relatively troubled firms. A positive sign of the parameter could be interpreted as support for that prediction.

Finally, an *intercept* and *time* and *sector* dummy variables are also included in the regressions. The sector dummy variables are thought to capture characteristics intrinsic to a particular sector that may affect the probability of obtaining trade credit. For instance, during the survey period the textile sector did not fare well because the market for clothing was flooded by (relatively) cheap textile products from India. Time dummy variables are included in order to see whether access to trade credit has increased over time.

4.3 Estimation results

Tables 3 to 4 present the results for trade credit and advance payment, respectively. Columns 1-3 in both tables show the estimates for the probability of obtaining trade credit/advance payment, while columns 4-6 present the determinants of how much trade credit/advance payment was obtained. Generally, the models for advance payment are weak in explanatory power. This is partly due to the low incidence of advance payment. For sure, the lack of guidance as to which regressors to include plays a role as well. Those results should, therefore, be viewed with some caution.

In most cases the panel regression is preferred to the cross-section regression, as indicated by the statistical test for the appropriateness of a panel specification. However, since marginal effects are not defined for panel-data models, only the fact that a certain parameter is statistically significant can be analysed. Marginal effects are evaluated (at the mean) for the cross-section regressions and the

¹³ Due to how the question about capacity utilisation was formulated, it should be understood to mean how far a firm is from potential output. For that reason, larger numbers reflect lower capacity utilisation.

cross-section results are, therefore, still of considerable interest. Finally, when heteroscedasticity was detected, it was corrected for.

4.3.1 The use of trade credit

Table 3 shows that, based on the random-effects Probit results (RE Probit), the variables of interest are firm size, short- and long-term debt, the demand situation, promotional activities and the status of the firm. As can be expected from the literature review in Section 2, larger firms have better access to trade credit. A 100 per cent increase in firm size is associated with an increase in the probability of obtaining trade credit by six percentage points (holding everything else constant). The effect is not very large, which might reflect that previous literature has overestimated the effect due to omission of relevant explanatory variables.

In accordance with the matching hypothesis, short-term debt is negatively related to the access to trade credit. The effect is economically large in that an increase in short-term debt by one percentage point (3.7 per cent) is associated with a decrease in the probability of obtaining trade credit by 44 percentage points. Supporting the findings of Deloof and Jaegers (1999), it turns out that also long-term debt substitutes for trade credit. An increase by one percentage point (6.3 per cent) correlates with a decline in access to trade credit amounting to 27 percentage points. One interpretation is that firms that have already obtained credit from banks and non-bank financial institutions need less trade credit, which means that trade credit is used when bank loans are not obtained. Another interpretation could be that suppliers tend to view indebted firms with caution and simply extend them less trade credit.

On average, formal firms have a probability of obtaining trade credit 35-percentage points higher compared with informal ones. This, again, is a very large effect in economic terms. Investment in promotion, used as a proxy for reputation, increases the probability of obtaining trade credit. Again, the marginal effect is economically significant and it seems that if there is something at stake for firms (in this case their reputation) prudent behaviour is induced on the part of the borrower and so access to trade credit increases significantly. Poor demand for firms' products has a deteriorating effect on the likelihood of obtaining trade credit. Such a result also accords with the hypothesis, although the marginal effect is fairly small.

Contrary to expectations, there is some weak evidence in the case of the CS Probit that access to trade credit seems to be higher in the textile sector (compared with the reference sector metal). Given

the trouble in the textile sector, this result could be viewed as being consistent with the Frank-Maksimovic (1998) model. This effect is non-existent in the RE Probit. Overall, access to trade credit has increased over time, as is indicated by the time dummy variables.

Compared with previous studies that have highlighted firm size and ethnicity as two main determinants of access to trade credit, only firm size lives up to expectations. The role of ethnicity appears statistically uninteresting in explaining access to trade credit. Hence, the results presented so far suggest that too much emphasis on ethnicity might be misleading and that concentrating on more tangible determinants could be more rewarding from a policy viewpoint.

4.3.2 The amount of trade credit

Turning to the amount of trade credit acquired (as a share of total debt), the RE Tobit suggests focusing on firm size, demand conditions, skill level, and promotion.¹⁴ The CS Tobit further offers firm age, tangible assets, and firm status as possible determinants for the amount of trade credit. A 100 per cent increase in firm size is associated with an increase of three percentage points in trade credit. Again, the effect is not very large.

Poor demand conditions are a negative signal to the suppliers with respect to the amount of trade credit. During periods of low demand, firms have to pay a larger share of their purchases in cash. An increase in promotional expenditures has about the same magnitude of effect as for firm size or demand conditions. Higher skills signal higher ability and may therefore proxy for lower risk. These results suggest that lower risk has a significantly positive association with the trade credit amount. Relatively older firms obtain more trade credit, which may be due to a build-up of trust and reputation over time, gained, for instance, by repeated interaction and the fact that they have had time to enlarge and improve their social networks with suppliers.

Surprisingly, the share of tangible assets in total assets is negatively related to the amount of trade credit. The hypothesis was for tangible assets to be positively related to trade credit because such assets may be used as collateral and can be seized in the case of a breach of contract. Since an explanation for this odd result may be multicollinearity, the regression was re-run without the variable

¹⁴ Note that short- and long-term debts are included in the regression as dummy variables, since the dependent variable is already measured as a share of debt. This avoids the trivial result that debt shares sum to unity.

tangible assets. Exclusion of tangible assets rendered the parameter of long-term debt statistically significant, providing some support for the suspicion about multicollinearity. However, an alternative explanation for the negative parameter might be that firms that can offer collateral obtain bank loans and, therefore, they need not turn to alternative sources of capital like trade credit.

The status of the firm seems to be the most important determinant of trade credit amount by far. Formal firms obtain 20 percentage points more trade credit than do their informal colleagues. Over time, trade credit seems to constitute a larger share of total debt. This result might actually indicate that access to formal finance has decreased over time, thus forcing firms to shift towards alternative ways of financing. Alternatively, it could simply reflect “better times” and, hence, improved availability of trade credit.

4.3.3 The use of advance payment

Table 4 shows the regression results for advance payment. All models are weak in the sense that they display very few parameters that are statistically significant at conventional levels. As mentioned earlier in the paper, the regressions were run without the variable representing tangible assets, since it is not clear how a firm’s tangible assets could affect the decision of a client to pay in advance. Moreover, it is not obvious what tangible assets would have to do with firms requiring prepayment.

The RE and CS Probit estimates tell the same story: In terms of statistical significance, only short-term debt and ethnicity seem to matter for requesting advance payment. The negative effect from short-term debt on the likelihood of demanding advance payment is large (21 percentage points). Hence, a firm that has obtained short-term debt is much less likely to also ask for advance payment from clients. Again, this result supports the notion of matching debt.

An almost equally large negative effect is obtained for Asian-owned firms. It is not clear why Asian owners do not ask for advance payment, but one hypothesis is that these firms have fairly good knowledge about their clients. If Asian owners are more selective than other owners there is less reason to fear late or non-payment. Another explanation may be that Asian owners socialise with their clients to a larger extent than do owners from other ethnic groups; in that way they acquire better information about their clients and do not need to ask for advance payment.

Interestingly enough, both firm size and firm status have little or no association with the decision of requiring advance payment. Near statistical significance (setting the critical level to 10 per

cent) is obtained for the parameter of firm age, which might indicate that relatively young firms tend to ask for advance payment more often than older firms do. Clients have tended to pay, or been required to pay, more often in advance over time.

4.3.4 The amount of advance payment

Next the results for the amount of advance payment are presented. As for statistically significant parameters, attention shifts to profit per employee, skill, and Asian ownership. The role of the last variable has already been discussed. Still it is interesting to note that Asian owners, in addition to receiving advance payment less often than the reference group, require a smaller amount of advance payment when asking for it.

It was previously argued that skill signalled ability and low risk, but it is not easy to see how this explanation fits here, at least not with a positive parameter (a negative parameter was expected). One explanation could be that greater ability allows a better interpretation of which clients are relatively risky, and for that reason relatively skilled firms may require more advance payment.

Also relatively profitable firms ask for more advance payment from their clients. The parameter sign goes against the current hypothesis, but in economic terms the effect from profits on advance payment appears small. As for the case of trade credit, positive parameters for the time dummy variables are obtained for the amount of advance payment received as well, thus indicating that the amount of advance payment too has increased over time.

4.3.5 Summary of results

To summarise, the main determinants for trade credit obtained are firm size, indebtedness, demand conditions, promotion, firm status, and the skill level of the firm staff. To some extent firm age appears to play a role. It is common to the more important determinants, except for demand conditions, that they can be associated with a certain type of company: It would typically be a relatively large formal firm with some human capital and with enough resources to promote its products. Furthermore, these characteristics also carry the kind of information that permits access to formal bank credit and so lessen the need for trade credit. Demand conditions are obviously not a firm characteristic, and there is little a

firm can do to affect demand. As regards ethnicity, it seems to be the case that previous work may have overestimated its importance

The models for advance payment from clients pointed out a few determinants: firm size, profit, leverage, skill, and ethnicity (besides the time dummy variables and two sector dummy variables). There was no clear pattern, and what matters for the probability of receiving advance payment is different from what matters for the amount received. Over time, the access to and the amount of trade credit, as well as advance payment have increased.¹⁵

5. Conclusions

This paper set out to investigate the importance of and the access to trade credit and advance payment in Kenyan manufacturing. The dataset used for the investigation was a three-year panel of more than 200 firms, collected in Kenya between 1993-95. The paper started with a descriptive analysis, which was followed by a regression analysis attempting to explain access to trade credit as well as demand for advance payment.

The descriptive analysis indicated that trade credit constituted an important part of Kenyan firms' loan portfolios. For formal firms there were large differences across firm size and ethnicity in how large a part of external finance trade credit accounted for. Large disparities were also found between formal and informal firms. The differences were less pronounced when studying the use of trade credit, although small and informal firms tended to obtain less trade credit than did other groups.

The regression analysis, based on both cross-section and panel-data specifications, suggested that firm size, promotional activities, the formal status of the firm, demand conditions, and the short- and long-term external financing position were important explanatory factors behind the probability of obtaining trade credit. The strongest factors in explaining access to trade credit were firm size and a formal status of the firm, with the result for firm size being in line with previous research. The strong

¹⁵ The estimation results were checked for their robustness with respect to a non-linear representation of debt, location in one of the two biggest cities of Kenya, inventories as another proxy for tangible assets, foreign versus domestic ownership, the degree of outward-orientation proxied by whether a firm exports or not and, finally, the time period the variable values were reported by firms. For trade credit, the only tenuous variable seems to be firm age, which had a tendency to turn statistically unimportant at conventional levels when all firms not reporting annual figures were deleted. Otherwise, the results for trade credit were robust to the proposed alternatives. For advance payments, big city location and outward-orientation turn out to be candidate explanatory variables, but otherwise also these results were robust. A complete set of results can be obtained upon request from the author.

argument put forward in Fafchamps (1997) on the unfavourable situation of African-owned firms regarding access to trade credit found little support here. For the amount of trade credit, firm age, tangible assets (with an unexpected sign) and educational level were found to be additional determinants.

While the specifications for trade credit obtained seemed to work quite well in terms of explaining access to such credit, the specifications showed poor explanatory power for advance payment from clients. There was some evidence that ethnicity plays a role in that Asian-owned firms appear to demand less prepayment. In addition, short-term debt was negatively associated with access to such credit, while more profitable firms received larger amounts of advance payment.

The paper has shown that trade credit and formal borrowing are substitutes. Firms with formal loans demand trade credit to a lesser extent than do firms with poorer access to formal credit. For the latter group, trade credit is an important alternative to formal borrowing. It is, however, possible to visualise a SSA version of the pecking-order of funding, while still preserving Myers's (1984) original description of it. Firms would first choose internal funding; thereafter they would turn to external sources. Of these, equity funding is irrelevant for most enterprises because the markets for such funding are only just developing. The loan category of external finance, on the other hand, can usefully be divided into formal loans, trade credit/advance payment, and informal loans. Firms seem to choose funding in that particular order. Companies first apply for regular bank loans. If the application is denied, they use trade credit to finance, say, investments or working capital. Only in the last instance would they turn to the informal financial market.

Three caveats about this study should be mentioned. Firstly, potential endogeneity of explanatory variables is not dealt with. The variable coming to mind first as an endogenous regressor is firm size. A firm may be large because it is able to obtain trade credit. For much the same reason profit may be endogenous. Due to possible endogeneity bias, the association between firm size (profit) and the firm being able to obtain trade credit may be overstated. In contrast, it can be argued that access to external finance only affects firm size and profit with a time lag. Furthermore, the questions that were asked about financial and real variables serve the purpose of providing instruments to deal with some simultaneity problems, although, strictly speaking, lagged variables are not appropriate instruments. Endogeneity seems less of a problem in the case of advance payment.

Secondly, while panel-estimation results are preferred to cross-section results, any marginal effects have to be evaluated on the basis of the latter. Furthermore, in some cases the cross-section results were adjusted for heteroscedasticity, whereas such adjustment was not made for the panel-data models. For these reasons, some discrepancy remains between cross-section and panel-data results.

Thirdly, a disturbing issue is the notorious problem of disentangling supply and demand factors. The regression analysis in the paper is based on reduced form equations. However, it would be interesting to see a systems-approach to trade credit. Together with dealing with the potential endogeneity bias and the use of more advanced panel data models, taking a systems-approach would offer rich possibilities for future research on the use of trade credit.

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Table 1. Mean outstanding balances (Ksh ‘000), average of 1993-95

Inflow of Funds	African	Asian	Other	Micro	Small	Medium	Large	Formal	Informal
Gross outstanding	19588	23694	33794	1169	1558	7046	61610	24195	117
Balances									
<i>Of which in per cent:</i>									
Short-term formal loans	19.20	42.00	23.04	28.84	29.24	40.49	36.87	36.25	6.94
Long-term formal loans	32.22	17.87	20.17	26.63	18.60	20.74	20.04	20.35	9.96
Informal loans	8.73	1.53	2.77	7.42	7.71	1.80	1.07	3.08	13.85
Owed to Suppliers	25.63	34.58	43.03	13.75	35.61	32.27	37.40	33.78	18.53
Owed to Clients	14.22	4.02	10.99	23.76	8.84	4.70	4.63	6.54	50.72
N	74	257	36	19	75	142	122	359	63

Note: Included in the Table are only firms that had any external finance in at least one of the three years examined and that have data for all categories of inflows. Furthermore, lack of data on Firm size and Status of firms (i.e. Formal vs. Informal) produces a sum of observations for these two categories less than the sum of observations for Ethnicity. Median figures are in parentheses. The Size [Micro (1-5 employees), Small (6-20), Medium (21-75), and Large (76+)] and Ethnic [African, Asian, and Other] groupings refer to formal firms only. Informal firms almost exclusively consist of microenterprises. N stands for number of observations.

Table 2. Proportion of Firms with External Finance and Financial Assets, 1993-95

Prop. of firms with:	African	Asian	Other	Micro	Small	Medium	Large	Formal	Informal
Overdrafts	44.12	71.29	50.00	33.33	43.69	67.86	79.02	63.27	7.56
Formal loans	48.04	38.71	39.58	35.00	29.13	38.69	53.85	40.27	13.37
Informal loans	10.78	7.74	6.25	8.33	11.65	7.14	6.29	7.96	20.35
Owed to Suppliers	46.08	64.52	66.67	22.22	53.40	61.90	71.33	59.96	16.28
Owed to Clients	26.47	15.81	35.42	33.33	21.36	16.07	19.58	19.69	39.53
N	102	310	48	36	103	168	143	452	172

Note: Since a firm can finance its operations from a combination of sources the number in the table do not sum up to 100 per cent. Furthermore, lack of data on Ethnicity and Status of firms (i.e. Formal vs. Informal) produces a sum of observations for these two categories less than the sum of observations for Firm size. N stands for number of observations.

Table 3. Trade Credit Obtained, 1993-95.

	CS Probit	Marginal Effects	RE Probit	CS Tobit	Marginal Effects	RE Tobit
Constant	-1.173** (2.551)	-1.265*** (4.444)	-4.538*** (3.229)	-1.595*** (5.497)	-0.728*** (6.851)	-1.024*** (3.237)
Log Firm age	0.060 (1.276)	0.065 (1.417)	0.180 (0.781)	0.079* (1.890)	0.036* (1.881)	0.086 (1.480)
Log (Profit/Employee)	-0.017 (1.530)	-0.017 (1.344)	-0.026 (0.657)	0.000 (0.066)	0.000 (0.066)	-0.003 (0.356)
Log Firm Size	0.059** (2.399)	0.063*** (3.876)	0.241*** (3.740)	0.071*** (4.678)	0.033*** (5.094)	0.045*** (2.638)
Short-term formal debt	-0.410*** (2.618)	-0.442*** (4.389)	-1.446*** (4.230)	-0.068 (0.972)	-0.031 (0.971)	0.007 (0.074)
Long-term formal debt	-0.278** (2.288)	-0.267*** (2.753)	-0.929** (2.001)	-0.088 (1.642)	-0.040 (1.643)	-0.096 (1.452)
Demand	-0.072** (2.189)	-0.078*** (3.075)	-0.267*** (3.115)	-0.109*** (4.487)	-0.050*** (4.425)	-0.088*** (3.871)
Tangible Assets	-0.147 (1.423)	-0.158 (1.538)	-0.198 (0.456)	-0.234** (2.428)	-0.107** (2.435)	-0.055 (0.553)
Educational level of staff	0.076 (0.858)	0.082 (0.883)	0.392 (1.001)	0.176* (1.791)	0.080* (1.790)	0.138* (1.684)
Promotion-sales ratio	0.184*** (2.830)	0.198*** (3.473)	0.291*** (2.811)	0.063*** (3.938)	0.029*** (3.844)	0.045* (1.890)
Formal firm	0.319** (2.293)	0.345*** (2.785)	0.909* (1.911)	0.456*** (2.919)	0.208*** (3.144)	0.179 (1.303)
African owner	-0.038 (0.340)	-0.041 (0.344)	-0.428 (0.719)	-0.043 (0.449)	-0.020 (0.448)	-0.154 (0.993)
Asian owner	0.114 (1.094)	0.123 (1.116)	0.225 (0.403)	0.013 (0.166)	0.006 (0.166)	-0.010 (0.073)
Food sector	0.034 (0.516)	0.037 (0.513)	-0.143 (0.376)	-0.029 (0.428)	-0.013 (0.428)	-0.000 (0.004)
Wood sector	0.000 (0.001)	0.000 (0.001)	-0.161 (0.447)	-0.074 (0.988)	-0.034 (0.981)	-0.071 (0.742)
Textile sector	0.148* (1.716)	0.159** (2.086)	0.441 (1.231)	0.001 (0.010)	0.000 (0.010)	0.055 (0.591)
Year 2	0.258*** (2.593)	0.278*** (4.319)	1.009*** (3.971)	0.218*** (3.542)	0.099*** (3.419)	0.276*** (5.440)
Year 3	0.273*** (2.666)	0.295*** (4.641)	1.049*** (3.658)	0.176*** (2.888)	0.080*** (2.809)	0.227*** (3.573)
N / Firms	463/222	----	463/222	463/222	----	463/222
R ² ^a	0.59	----	0.70	----	----	0.70
Log-Likelihood	-220.49	----	-217.80	-264.53	----	-282.23
Joint $\beta = 0$ ^{b, c}	200.26***	----	154.00***	181.27***	----	124.13***
Heteroscedasticity ^d	15.24***	----	----	35.39***	----	----
Pooled vs. Panel ^e	----	----	20.62***	----	----	37.14***

Note: ***, **, and * indicate significance at 1 %, 5 %, and 10 % respectively. Absolute t-values are in parenthesis. N stands for number of observations, while Firms stands for number of firms. CS and RE refer to cross section and random-effects, respectively. Marginal effects are evaluated at variable means. For Probit each debt category is defined as its share of total debt, while for Tobit each debt variable is represented with a dummy variable taking the value of unity when the firm has an overdraft facility and long-term loan, respectively, and zero otherwise.

^a For Probit, R² is Zavoina and McElvey's (1975) pseudo R² ^b For cross-section Probit: Wald test of slope parameters jointly zero, χ^2 [df] ^c For random-effects Probit: Likelihood ratio test of slope parameters jointly zero, χ^2 [df] ^d For cross section Probit and Tobit: Likelihood ratio test of H₀: No heteroscedasticity, χ^2 [df] ^e Likelihood ratio test of H₀: Pooled, χ^2 [df]

Table 4. Advance Payment Received, 1993-95.

	CS Probit	Marginal Effects	RE Probit	CS Tobit	Marginal Effects	RE Tobit
Constant	-1.344** (2.307)	-0.451** (2.290)	-1.685* (1.671)	-0.808* (1.835)	-0.166* (1.870)	-0.623 (1.117)
Log Firm age	-0.192 (1.629)	-0.054 (1.635)	-0.236 (1.394)	-0.081 (1.168)	-0.017 (1.173)	-0.089 (0.999)
Log (Profit/Employee)	0.043 (1.592)	0.012 (1.602)	0.051 (1.445)	0.039** (2.278)	0.008** (2.319)	0.043** (2.404)
Log Firm Size	0.058 (1.421)	0.016 (1.430)	0.057 (1.047)	0.003 (0.119)	0.001 (0.119)	-0.008 (0.254)
Short-term formal debt	-0.760*** (2.642)	-0.212*** (2.684)	-0.903** (2.196)	-0.013 (0.099)	-0.003 (0.099)	-0.021 (0.142)
Long-term formal debt	-0.256 (0.865)	-0.071 (0.865)	-0.263 (0.674)	-0.074 (0.713)	-0.015 (0.712)	-0.032 (0.253)
Demand	0.017 (0.292)	0.005 (0.292)	0.019 (0.204)	0.013 (0.375)	0.003 (0.375)	0.011 (0.252)
Educational level of staff	0.347 (1.479)	0.097 (1.476)	0.372 (1.272)	0.288** (2.116)	0.059** (2.081)	0.229* (1.776)
Promotion-sales ratio	-0.022 (0.357)	-0.006 (0.357)	-0.022 (0.288)	-0.011 (0.317)	-0.002 (0.317)	-0.009 (0.215)
Formal firm	0.022 (0.088)	0.006 (0.088)	0.057 (0.177)	-0.094 (0.650)	-0.019 (0.649)	-0.074 (0.464)
African owner	0.176 (0.603)	0.050 (0.596)	0.156 (0.353)	0.179 (1.028)	0.037 (1.029)	0.118 (0.439)
Asian owner	-0.601** (2.324)	-0.168** (2.348)	-0.710* (1.774)	-0.361** (2.350)	-0.074** (2.385)	-0.386 (1.634)
Food sector	-0.945*** (3.562)	-0.203*** (5.171)	-1.096** (2.493)	-0.666*** (3.913)	-0.137*** (4.296)	-0.654** (2.506)
Wood sector	0.519*** (2.876)	0.158*** (2.688)	0.605** (2.456)	0.274*** (2.611)	0.056*** (2.608)	0.274** (2.068)
Textile sector	0.328* (1.672)	0.098 (1.588)	0.407 (1.542)	0.148 (1.284)	0.030 (1.293)	0.173 (1.241)
Year 2	0.480*** (2.745)	0.143*** (2.613)	0.552*** (2.810)	0.346*** (3.284)	0.071*** (3.313)	0.339*** (3.062)
Year 3	0.578*** (3.225)	0.176*** (3.046)	0.655*** (2.736)	0.373*** (3.461)	0.077*** (3.479)	0.357*** (2.754)
N / Firms	480/225	----	480/225	480/225	----	480/225
R ² ^a	0.53	----	0.57	----	----	----
Log-Likelihood	-222.59	----	-220.07	-247.78	----	-242.63
Joint $\beta = 0$ ^{b, c}	105.38***	----	92.66***	636.32***	----	105.30***
Heteroscedasticity ^d	0.98	----	----	1.15	----	----
Pooled vs. Panel ^e	----	----	5.04**	----	----	10.30**

Note: ***, **, and * indicate significance at 1 %, 5 %, and 10 % respectively. Absolute t-values are in parenthesis. N stands for number of observations, while Firms stands for number of firms. CS and RE refer to cross section and random-effects, respectively. Marginal effects are evaluated at variable means. For Probit each debt category is defined as its share of total debt, while for Tobit each debt variable is represented with a dummy variable taking the value of unity when the firm has an overdraft facility and long-term loan, respectively, and zero otherwise.

^a For Probit, R² is Zavoina and McElvey's (1975) pseudo R² ^b For cross-section Probit: Wald test of slope parameters jointly zero, χ^2 [df] ^c For random-effects Probit: Likelihood ratio test of slope parameters jointly zero, χ^2 [df] ^d For cross section Probit and Tobit: Likelihood ratio test of H₀: No heteroscedasticity, χ^2 [df] ^e Likelihood ratio test of H₀: Pooled, χ^2 [df]