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**SIN WORKING PAPER SERIES**

**ACCESS TO FORMAL FINANCE IN KENYAN MANUFACTURING**

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**Abstract:** The descriptive analysis shows that access to formal credit significantly varies across firm size and firm status. The required collateral is often several times the borrowed amount. However, whether security is asked for to some degree appears to depend on the ability to offer it. Multivariate analysis reveals that factors affecting the credit decision include firm status, firm size, ethnicity, the ability to pledge collateral, and to some extent the proximity between lenders and borrowers. The results suggest that dominating segments of the manufacturing sector, namely small firms, do not receive the much needed financial support necessary to enable manufacturing growth.

*Keywords:* Formal finance, Contract enforcement, Asymmetric information, Manufacturing sector, Kenya.

*JEL Classification:* G30; G32; O16; O17

## I. INTRODUCTION

It is known from economic development in OECD countries and the newly industrialised economies in East Asia that until a certain stage of maturity is reached, growth is driven largely by industrialisation. In most other countries as well, the need for a buoyant manufacturing sector is acknowledged to be an important means to increase overall welfare. But industrial development alone is not simply a matter of production processes; it is also a matter of a well-functioning financial sector, since it is a way to invest in real capital, to smooth expense- and income flows, and to externally finance working capital.<sup>1</sup>

Financial intermediation is not the only way to meet these needs, but since in Sub-Saharan African [SSA] countries there is no real possibility to finance investments through the stock market, “traditional” bank financing is called upon to provide this service. If factors like information asymmetry, an inefficient legal system unable to assist in contract enforcement and an unstable macroeconomic environment effectively hinder efficient financial intermediation, it follows that industrial-sector growth and overall economic development are compromised.<sup>2</sup>

Most SSA-countries entertained the idea that active government participation was needed for optimal credit allocation. This is why government intervention is still more of a rule than an exception, although financial-sector reform, with goals such as improved credit allocation to support private-sector development, and a more market-oriented view altogether, has reduced the scope of such participation.

Kenya provides an interesting example of the interplay between enterprise finance and industrialization. The country has a goal of dramatically reducing poverty by means of industrialization and rapid growth [Republic of Kenya, 1996] and the role of finance cannot be underestimated in achieving those goals. Kenya, it should be noted, has one of the most sophisticated financial systems in SSA.

In a “friction-less” world [i.e. one without asymmetric information and transaction costs] financial intermediation is not problematic and therefore the question of distinguishing between “good” and “bad” borrowers does not arise. All that matters then is whether a project is profitable or not. However, in reality, frictions prevail and lenders need to collect information about potential borrowers. Information being costly, it may be assumed that lenders try to minimize the costs involved in information-gathering. One way to minimize those costs is to use rules of thumb. For instance, lenders could assume that the size of the firm says something about the creditworthiness of borrowers. In

addition to size, economic theory suggests plenty of other factors that may influence the lenders' and borrowers' willingness to sign and comply with a loan contract. If financial intermediation is to be improved, it is necessary to understand which of these factors are actually at play.

This paper investigates the determinants of access to formal short- and long-term finance. The starting point is a theoretical model that represents the circumstances under which a loan contract is agreed upon, and the possible factors that might influence such an agreement. In standard fashion, the model presumes that there are significant transaction costs involved and that these costs are associated with asymmetric information about the borrower, monitoring problems, and imperfect enforcement mechanisms. The regression analysis draws from the theoretical model and tries to assess the importance of factors that have to do with the type of borrower, the ability to pledge collateral, the borrower's reputation, and demand for the borrower's products, among other factors.

A brief survey of previous work, relevant to SSA countries, discloses that the main result of Biggs et al [1996], based on one year of Kenyan micro data, is that access to formal borrowing increases with firm size. Fafchamps, Pender, and Robinson [1995] and Cuevas et al [1993] obtain similar results for Zimbabwe and Ghana, respectively. Bigsten et al [2001], using an innovative approach, cover six SSA countries and show that firm size and a higher debt-ratio positively affect the probability of obtaining formal credit. They also find that state-owned companies and companies with a single owner receive less external credit than do other firms. Finally, Fafchamps [2000] obtains the result that firm size and network effects are important factors for accessing formal credit. He also finds that the ethnic origin of the owner is of no relevance to the lender's credit decision — a result that is disputed in this paper.

The empirical analysis of this paper is based on a three-year panel dataset collected between 1993-95, which consists of more than 200 Kenyan manufacturing firms. The time dimension of the dataset gives an advantage over the previous research mentioned above — the sole exception being the study by Bigsten et al [2001] — which were based on a cross-section of firms only. A snapshot [one year] approach appears insufficient when analysing a rapidly changing environment. Compared with Bigsten et al [2001], it is the author's conviction that the present study provides a more detailed analysis in the sense that the explanatory variables in the multivariate analysis better reflect the many suggestions of influential factors of credit market behaviour provided by economic theory. The

disadvantage, of course, is that only one country is being covered, but it is this factor that allows for a more detailed analysis.<sup>3</sup>

The descriptive analysis indicates that access to formal finance varies across firms. Firm status, firm size, and ethnic origin of the owner affect interest rates charged, how much collateral is required, and how the debt portfolio is composed. Results from regression analysis provide further support for the notion that borrower properties are important to the lending decision. For instance, firm status and ethnicity matter for the lenders' credit decision. Other variables pointed to are firm size and the proximity between lenders and borrowers. The ability to pledge collateral turns out to be an important factor, while the negative parameter of profitability suggests that internal resources are preferred to external ones. Yet another outcome is that financial liberalization appears not to have increased credit supply to manufacturing firms.

The rest of the paper is organized as follows: Section Two presents a general model based on the theory of contracts, which illustrates under what conditions contracts are established and what factors may be involved. The data are described in Section Three. Thereafter, the Section provides information on Kenyan firms' debt portfolios, collateral and interest rates. In Section Four, results from the multivariate analysis are discussed. Section Five concludes the paper.

## **II. THEORY**

The concepts of imperfect information and contract enforcement are central to the subject dwelled on here. Due to asymmetric information, lenders are willing to expend real resources on the acquisition of information. Therefore, imperfect information can explain the type of contract and credit rationing, as well as transaction costs associated with monitoring and screening [Williamson, 1985]. Because of asymmetric information, a lender uses information on the type of borrowers. From this results an action with several outcomes, for instance, signalling and discrimination.<sup>4</sup> Furthermore, Jensen and Meckling [1976] and Myers [1984] argue that internal resources may be preferred to external finance due to information, agency, and transaction costs.

Under certain circumstances, collateral can substitute for information. This can occur when the legal system works properly, the value of collateral is sufficient, and this value can be preserved over time. When these conditions are fulfilled, the type of borrower is no longer of interest to the lender.

Because of the collateral, the borrower will not breach the contract. However, insufficient collateral immediately brings back the issue of asymmetric information.

The second concept, contract enforcement, is of considerable importance for the contract itself. Enforcement can take several forms of which one is legal action. It works when the legal system functions efficiently, but even then, seizing and selling collateral is costly. When the legal system cannot play its role efficiently, other forms apply. These include stopping the relationship [e.g. see Cole, 1998], harassing [Bülow and Rogoff, 1989] provide an example in the case of sovereign lending, but the idea is applicable here too], threatening to tell other lenders about the non-compliance with the contract [reputation], or acting illegally.

The present section outlines a simple general model, which is based on the above-mentioned concepts. The model consists of two parties and provides information of when a contract is agreed upon and of what kind of factors may influence the parties during negotiation. The modelling exercise is expected to provide useful guidance towards selecting explanatory variables for the empirical work in Section Four.<sup>5</sup>

### ***II.A The model***

Consider two time periods, 1 and 2. The lender promises to extend a loan  $L$  in time 1 in exchange for repayment  $R$  of money in time 2. At time 2, the borrower decides whether or not he will comply with the contract, where the decision is assumed to vary with the type of borrower [e.g. skilled versus unskilled, good reputation versus bad reputation, small versus large firm, and so forth].

The cost to the borrower to deliver  $R$  can be written as  $\pi(-R, T, \varepsilon)$ , where  $T$  denotes the type of borrower and  $\varepsilon$  symbolizes the state of nature at time 2.<sup>6</sup> Type  $T \in \Delta$  is any characteristic of the borrower relevant to the contracting situation [e.g. skill, honesty, firm size, or firm age]. The state of nature,  $\varepsilon \in \Phi$ , refers to anything exogenous and unknown to the parties at time 1 that may influence compliance. If there is an unexpected event, the ability to comply depends on  $T$ . Information asymmetries are assumed to be as follows:  $\Delta$  and  $\Phi$  are common knowledge, but only the borrower knows his type  $T$ .

In the next step, punishment in the case of breach of contract is incorporated, which for the borrower means that instead of receiving a payoff he receives punishment. It is assumed that

punishment comes in four ways: guilt, coercion, the end of the business relation, and loss of reputation. Guilt comes at a cost of  $G(T, \varepsilon)$ , while coercion implies the cost  $K(T, \varepsilon, C)$ . The other two parts of punishment are based on repeated interaction, namely, the suspension of future trade resulting in the expected loss  $ExpL(\varepsilon, T)$ , and damaged reputation, with an expected negative effect on the borrower's dealings with other lenders  $ExpO(\varepsilon, T)$ . These two terms refer to the expected discounted value of future transactions with a given lender and with other lenders, respectively.

Borrowers with little guilt incur low  $G(T, \varepsilon)$ ; borrowers hard to coerce have low  $K(T, \varepsilon, C)$ ; borrowers with no interest in preserving their relationship with the lender or their reputation, respectively, have low  $ExpL(\varepsilon, T)$  and  $ExpO(\varepsilon, T)$ . Also, if the cost of legal or illegal proceedings is high relative to the value of the loan, the threat to sue has low credibility and  $K(T, \varepsilon, C)$  is low.

As long as the cost of compliance is smaller than the sum of penalties, the borrower will fulfil the contract<sup>7</sup>

$$G(T, \varepsilon) + K(T, \varepsilon, C) + ExpL(\varepsilon, T) + ExpO(\varepsilon, T) \geq \pi(-R, T, \varepsilon). \quad (1)$$

Next the condition for the lender to enter the contract is investigated. Let  $\pi(-R)$  and  $\pi(-L)$  be the value of  $R$  and  $L$  to the lender. At time 1, there are gains from loan extension if  $\pi(-L) > \pi(-R)$ . The lender forms beliefs of the likelihood of being paid, i.e. that (1) will be satisfied. To evaluate this probability, the lender uses all available information  $\Sigma$  at time 1. The information available is the distribution of potential borrower types, information gathered from previous interactions with the borrower, and information obtained from others about the client. Let  $Z(T, \varepsilon/\Sigma)$  be the joint cumulative distribution over  $T$  and  $\varepsilon$  that captures the lender's beliefs given information  $\Sigma$ .

Since it is easier to fulfil the contract in good states, states of the world are ranked such that, for any client type  $T$ ,  $\pi(-R, T, \varepsilon)$  is decreasing in  $\varepsilon$ . Also assume that each of the four penalties considered in (1) is non-decreasing in  $\varepsilon$ , which means that the client has more to lose in good than in bad states. Then the function  $s(T)$  can be defined as the level of shock  $\varepsilon$  at which (1) is exactly satisfied and the client  $T$  is just indifferent between compliance and breach. That is,  $s(T) = \varepsilon^*$  such that

$$\pi(-R, T, \varepsilon^*) = G(T, \varepsilon^*) + K(T, \varepsilon^*, C) + ExpL(\varepsilon^*, T) + ExpO(\varepsilon^*, T). \quad (2)$$



For any shock above  $s(T)$ , the borrower pays, and for any shock below  $s(T)$ , there is no payment at all.<sup>8</sup> Let  $(\underline{\varepsilon}, \bar{\varepsilon})$  and  $(\underline{T}, \bar{T})$  be the lowest and highest values that  $\varepsilon$  and  $T$  can take. A rational lender would then agree to a contract if and only if what the lender expects to receive is greater than what is provided. This can be formulated as equation (3):

$$\mathbf{Exp}(\Pi(R)/\Sigma) = \Pi(R) \text{prob}(\text{payment}) = \Pi(R) \int_{\underline{T}}^{\bar{T}} \int_{s(T)}^{\bar{\varepsilon}} dZ(T, \varepsilon/\Sigma) \geq \Pi(L). \quad (3)$$

To clarify matters a bit, consider the following example. Say the borrower's type is  $T'$ . Then the probability of being paid is equal to the probability that  $\varepsilon > s(T')$ , i.e. equal to  $\int_{s(T')}^{\bar{\varepsilon}} dZ(T, \varepsilon/\Sigma)$ .

However, since the lender does not know  $T$ , the probability of being paid must be computed over all possible types [hence the use of the double integral].

The lender can affect the probability of repayment by influencing how the contract  $C$  is formed [e.g. the borrower may be forced to sell assets to service the debt in case he goes bankrupt]. Such an arrangement does not come without cost, however. If contract-enforcement mechanisms other than  $K(T, \varepsilon, C)$  are sufficient, the solution may be to bypass formal guarantees. In economies where legal systems are weak and inefficient, repeated interaction is a significant enforcement mechanism. Imperfect 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. Since repeated interaction often works well in commercial trade, limited use of formal guarantees and the court system can be expected [for an empirical application, see e.g. Isaksson, 2001a]. Basically the same holds true for informal-financial arrangements [see e.g. Isaksson, 2001b].

A rational borrower will agree with the contract ex ante if and only if he expects the benefit to be positive. The borrower knows  $T'$ , let  $\pi(L, T')$  denote the value of receiving  $L$  for the borrower.<sup>9</sup> If in period 2 the borrower pays, he incurs a cost of  $\pi(-R, T', \varepsilon)$ . If the borrower decides not to pay, he

incurs the punishments in (1). Given the borrower's type, payment occurs with probability  $\int_{s(T')}^{\bar{\varepsilon}} dF$  ( $\varepsilon/T'$ ). Therefore, the following condition for the borrower's acceptance of the contract is arrived at:

$$\begin{aligned} \pi(L, T') \geq & \int_{s(T')}^{\bar{\varepsilon}} \pi(-R, T', \varepsilon) dF(\varepsilon/T') \\ & + \int_{\underline{\varepsilon}}^{s(T')} \{G(T', \varepsilon) + K(T', \varepsilon, C) + \mathbf{ExpL}(\varepsilon, T') + \mathbf{ExpO}(\varepsilon, T')\} dF(\varepsilon/T'). \end{aligned} \quad (4)$$

The empirical analysis in Section Four is based on this model in the sense that the variables used to explain access to formal credit are chosen with this model in mind. Another source of explanatory variables are the previous studies briefly surveyed in the introduction.

### III. DATA AND DESCRIPTIVE ANALYSIS

#### III.A The dataset

The data used in this paper constitute a comprehensive panel-data set on a sample of firms within the Kenyan manufacturing sector. The data cover 1993-95, which are also the years when the data were collected.<sup>10</sup> The collection of data was organized by the World Bank in a research project called Regional Program on Enterprise Development [RPED], and undertaken by a team from Göteborg University and Nairobi University.

The dataset consists of more than 200 firms from four industrial sub-sectors: Food, Wood, Textile, and Metal. These sectors were selected because firms in these sectors were perceived to have the greatest likelihood of exporting. These firms are located in four different cities, Nairobi, Mombasa, Nakuru, and Eldoret. They range from micro-firms to multinationals. Further, the dataset covers informal as well as formal firms. Aguilar and Bigsten [2001] in detail discuss the data collection and sampling procedure.

### ***III.B Debt portfolios and the incidence external finance***

Table 1 presents the mean debt portfolios by: First, firm status [i.e. whether the firm is formal or informal] and; second, by firm size [as measured by the number of employees] and ethnic origin of the firm owner for formal firms only.

It is clear from Table 1 that, in absolute terms, formal firms borrow a lot more than do informal firms. The mean informal firm only borrows 0.4 per cent of what the mean formal firm does. For the formal firms, 36 % of external finance comes from short-term borrowing such as overdraft facilities. Long-term borrowing from commercial banks and non-bank financial institutions [NBFIs] constitutes 20 per cent of a formal firm's debt portfolio. Corresponding figures for informal firms are seven and 10 per cent, respectively.<sup>11</sup>

Across formal firms, African-owned firms borrow almost as much as Asian-owned firms, but the ethnic group that borrows the most is the residual one ["Other"]. While Asian- and "Other"-owned firms tend to have a larger share of formal finance in the form of short-term borrowing, African-owned firms have 32 per cent in long-term borrowing and only 19 per cent in short-term debt. Asian-owned firms hold 42 per cent short-term and 18 per cent long-term, while for the category "Other" the corresponding figures are 23 and 20 per cent, respectively. A plausible explanation for this discrepancy across ethnicity is that African owners that get to borrow tend to be large. In general, firm-owners of Asian and, say, European origins have higher access to formal finance given any firm size.<sup>12</sup> Whether this explanation holds when controlling for other determinants is something the paper returns to below.

Compared with Micro and Small firms, relatively large firms [Medium and Large], among formal firms, tend to hold relatively large shares of external finance in short-term borrowing [between 37 and 40 per cent]. Somewhat surprisingly, however, Micro firms have the largest share of long-term borrowing [27 per cent], although in absolute terms the amount is, of course, very small. The share of long-term borrowing for the other size groups is in the vicinity of 20 per cent.

In general, short-term credit is much more common than the long-term one. On the part of the banks, short-term credit could be a way to control borrowers, a mechanism used more often when financial infrastructure is undeveloped [Diamond, 1991]. However, a matching-hypothesis may suggest that short-term external finance should mainly be used for working-capital purposes and that acquisition of fixed assets and equipment do not bring a rate of return at par with short-term loan costs.

Overdraft facilities together with trade credit from suppliers account for more than 70 per cent of the debt portfolio for the mean formal firm. Whether this reflects demand from the firms or restricted supply on the part of financial institutions is further discussed below. But one explanation for the great use of [at least] trade credit is the weak legal system and undeveloped financial system, which restrict supply of formal credit.<sup>13</sup>

Table 2 shows the number of firms that have a certain credit category. Comparing first across firm status, it can be seen that 63 per cent of the formal firms have an overdraft facility and that only 7.5 per cent of the informal firms have such a facility. More than 10 per cent [13 per cent] of the informal firms have borrowed on long-term basis, while the corresponding figure of formal firms is 40 per cent. Across formal firms only, Table 2 shows that 71 per cent of the Asian-owned firms borrow short-term, while the figure for African-owned firms is 44 per cent only.

The roles shift when it comes to long-term borrowing because 48 per cent of the African-owned firms borrow long-term, while only 38-40 per cent of the Asian- and “Other”-owned firms do that. In other words, it seems that non-African-owned firms favour short-term borrowing, while African-owned firms prefer long-term borrowing. Another interpretation of this result, however, is that African-owned firms are discriminated against, or that Africans tend to own small or young firms. Finally, as can be expected, the incidence of short- and long-term loans tends to increase with firm size.

### ***III.C Collateral and interest rates***

Are firms treated differently as to how often and much collateral they have to pledge? Does the cost of borrowing differ across firms of different types? These are the topics investigated in Table 3. Since commercial banks and NBFIs traditionally have had different lending policies it is useful to separate the two lenders. In general, it is found that NBFIs loans less often require collateral and that the collateral-loan ratio is smaller. However, there is some evidence that NBFIs tend to charge a higher interest rate on the loans.

A comparison between formal and informal firms for loans from commercial banks [the number of observations for informal firms’ borrowing from NBFIs is too small to be analysed in any credible way] reveals that collateral is demanded in almost every case for both categories of firms. However, informal firms have to pledge a higher amount of collateral for each amount of loan. This may not

necessarily indicate that informal firms are not trusted as borrowers. Instead it could be a reflection of the lump-sum character of security that, for instance, land constitutes, and that informal firms tend to borrow only fairly small amounts. Another explanation for the general observation that collateral-loan ratios exceed unity is that it might mirror the uncertain enforcement prospects of contracts in Kenya as well as the costs of seizing and selling collateral. Interestingly, formal firms are charged a higher interest rate than informal firms. This could be a reflection of paying capacity or that interest rates increase with the loan amount.

The frequency of collateralised loans appears to be the same across ethnicity [for formal firms], but lower in the case of NBFIs. Asian-owned firms pledge the highest amount of collateral, followed by African- and “Other”-owned firms. The mean value of the collateral-loan ratio for Asian-owned firms is a whopping seven per cent, although the median collateral-loan ratio is only half of that. Still, it appears that collateral several times the loaned amount must be offered. Asian-owned firms also pay the highest interest rate and the median interest rate is three percentage points higher than that for African- and “Other”-owned firms. This could be a sign of significant network effects, where African and “Other” owners in such cases are the ones connected to the bankers. However, it could also suggest that African-owned firms have lower payment capacity than Asian-owned firms.

The larger the firm, the higher the frequency of collateralised loans [for formal firms]. This means that smaller firms that cannot put up collateral still can get a loan. One might expect higher interest rates for such firms, but this is not the case. Micro firms, the category of firms that have the least number of collateralised loans [37 per cent], also by far pay the lower interest rate [on average only about 12 per cent, while the other size categories pay approximately 20 per cent]. The collateral-loan ratio for Micro firms is only two per cent; corresponding figures for Small to Large firms is about six per cent. However, one should bear in mind that Micro firms obtain far fewer loans than the other size groups, and that it is only when they are lucky enough to obtain a loan they get such favourable conditions.

#### **IV. EXPLAINING THE ACCESS TO FORMAL CREDIT**

The previous section provided a description of which type of firms use formal credit, about the costs involved, the requirements of pledging collateral, and how access and the cost of borrowing have changed since financial liberalization. In this section multivariate analysis is employed to identify the

factors that influence the probability of obtaining short- and long-term loans and the amount of loan a firm gets to borrow. First, the dependent and independent variables are defined; thereafter the econometric results are discussed.

#### ***IV.A The dependent variables***

Two sets of regressions are estimated; the first one pertains to the likelihood that a firm has obtained an overdraft facility and the amount of overdraft obtained [as a share of total debt]. The second set relates to the likelihood that a firm has obtained long-term borrowing from a commercial bank or NBFIs and, again, how large an amount the firm could borrow [as a share of total debt]. For the likelihood of having an overdraft facility or a long-term loan, the dependent variable is dichotomous [one if the firm has a positive outstanding balance of formal loans and zero otherwise].

#### ***IV.B The explanatory variables***

The theoretical discussion is used as a guide to select the variables to be included on the right-hand side of the equations. The explanatory variables can be grouped into variables that represent the type of client, repeated interaction, reputation, enforcement, financial viability, market conditions, and other variables possibly relevant in explaining access to formal credit. While it is clear that a variable such as firm size can proxy for many important factors, it is the intention that these other factors be captured by other variables. Nevertheless, firm size [and other variables] is included at several places to illustrate its many facets.

##### Type of client

Since smaller firms are relatively risky, *firm size* [the logarithm of sales +1] is expected to be positively correlated with formal borrowing. Furthermore, there is more public information available for large firms than for smaller firms, which reduces asymmetric information. Relatively large firms can exert their market power. That is, losing a large customer could prove costly to the lender.

*Well-educated staff* [number of workers with higher education than secondary school in total labour force] could proxy for product-differentiation, itself a signal for lower risk and thereby better

possibilities of external financing. A *well-educated staff* also signals ability, which increase the prospects of survival and repayment ability.

Formal firms [*Firm status*: dummy variable taking the value of one for formal firms and zero otherwise], as opposed to informal firms, are expected to have greater access to formal borrowing because of better repayment ability and their being exposed to legal enforcement. *International contacts* are represented by a trade variable, the proportion of imported raw materials. Firms that have established international contacts are thought to operate on a larger market with greater product diversification. Moreover, such firms also have access to recent production techniques and can learn from participation in international trade.

*Ethnic* origin could also contain information. For instance, *African* owners [dummy variable with value one for African-owned firms and zero otherwise] probably trade more with other Africans than with other ethnic groups. Presumably African clients as a group are poorer and therefore more risky debtors than Asians and other non-Africans and this might reduce the chances for African-owned firms to obtain formal credit. If firms with *African* owners are subject to statistical discrimination, that is, if Africans as a group are viewed to be less reliable in repaying credit, then the coefficient of African ownership will enter with a negative sign. Such discrimination could arise if Africans receive less credit in the first place and have fewer possibilities to smooth cash-flow fluctuations. A second possibility is straight-out racial discrimination. The other *ethnicity* variable included is that of *Asian* ownership, hence leaving “Other” as the reference group to compare with. It is hypothesized that Asian ownership positively relates to formal borrowing because Asian owners may to a larger degree socialize with bankers and other business people.<sup>14</sup>

#### Repeated interaction

*Firm age* [the logarithm of years of age of the firm +1] is intended to proxy for repeated interaction with lenders. Such repeated interaction is believed to be positively related to the likelihood of obtaining formal credit as well as to the amount of financing a firm is able to raise. Another reason why *firm age* is hypothesized to be positively correlated with formal borrowing is that older firms could have established social and business network with other businesses and banks.

### Reputation

Firms spending resources on *promotion* [promotion as a share of sales] have incentives to fulfil promises and obligations in order to preserve reputation. Promotion could also proxy for brand name and firms with strong brand names have more to lose from breaking a contract. Promotion can therefore be seen as an investment in reputation and is expected to have a positive effect on obtaining formal credit.

*Firm size* is assumed to relate positively to formal borrowing because relatively large firms have more to lose in terms of reputation in case of breach of contract than do relatively small firms. The same argument applies to *firm status*.

### Enforcement

Relatively large firms [*firm size*] probably have more social capital at stake, which means that their reputation can be used as an enforcement mechanism. Firms with *tangible* assets [replacement value of capital as a share of total assets] have something to pledge as security, which leads to an expected positive association between tangible assets and formal credit.

### Market conditions

The level of capacity utilization captures the *demand situation* [the inverse of how much more a firm could produce if the demand were there]. A high degree of idle production capacity should be negatively related to chances of obtaining credit.

### Financial viability

*Gross profit* [gross profit per employee] is thought to proxy for a firm's financial viability. If profit succeeds in playing that role the expected sign of the parameter is positive. However, it is uncertain whether relatively profitable firms have more external finance because the theory of pecking order dictates that a firm's first choice of capital is internal. To the extent the pecking order is in operation, the expected coefficient of profit could actually be a negative one. A priori then, the expected sign of the parameter is ambiguous.



#### Other explanatory variables

If relatively large cities have better financial infrastructure, location in relatively *big cities* [dummy variable with a value of unity if the firm is located in either Nairobi or Mombasa, zero otherwise] could increase the likelihood of obtaining credit. On the other hand, larger cities could mean that the distance between borrowers and lenders is large, screening is difficult, and that possibilities of monitoring what the loaned amount is actually used for are reduced. In such a case it could turn out better to be located in a relatively small city where it is easy to establish a personal contact with the lender. Hence, a priori the expected sign of the coefficient is ambiguous.

*Time*-dummy variables are included to proxy for overall economic conditions and they are useful when assessing whether access to long-term capital has changed over time. Finally, sector-dummy variables are included to capture industry specificity that is not covered by other variables included.

#### ***IV.C Estimation results***

Four types of estimations are undertaken, two each for short- and long-term borrowing, where the first set of estimations consists of estimating Probit models to explain the probability that a firm has access to an overdraft facility or long-term loans. The second set of estimations uses Tobit and involves explaining how much short- and long-term credit a firm has obtained.

Two considerations come to mind. First, since a three-year panel is available, there may be good reason to estimate the panel versions of Probit and Tobit, respectively. According to the Hausman test, it is indeed the case that the data support the panel versions over the cross-section ones. The flip side, however, is the non-triviality of testing and correcting for heteroscedasticity in panel versions of limited-dependent models. And heteroscedastic variance seems to be the case throughout.

Second, due to a potential sample-selection bias, there may be good reason to do the Probit and Tobit estimations simultaneously. But, as with the problems of correcting for heteroscedasticity, a panel version of such simultaneous estimation is a non-trivial matter. However, simultaneous estimation of the cross-section versions does not for any “pair” of estimations indicate sample-selection bias and, therefore, the “two steps” are estimated separately. With these two considerations in mind, the estimation results are now presented.

First, the results from estimating a cross-section Probit [CS Probit] along with the marginal effects are presented; these results are followed by those of a random-effects Probit [RE Probit]. After the Probit estimations, a cross-section Tobit [CS Tobit], and the corresponding marginal effects, is estimated followed by a random-effects Tobit [RE Tobit]. It should be noted that when, in terms of parameters' statistical significance, the cross-section results equal those of panel results, no special reference is made to the panel-data results. However, when the results differ [e.g. a parameter statistically significant in a CS Tobit is statistically insignificant in the corresponding RE Tobit] there is a discussion of both results.<sup>15</sup>

Table 4 contains the results of two types of estimations: First, for the probability that a firm has incurred short-term credit in the form of overdraft and; second, for the amount of short-term borrowing. The Probit and Tobit results have in common the importance of firm size, firm status, firm location, and that a firm has international contacts. Firm age and the owner being African appear to have an impact on the amount of short-term borrowing only.

Starting with the probability of having an overdraft facility, it can be seen that this relates positively to firm size [marginal effects are evaluated at their means].<sup>16</sup> An increase in firm size by 100 per cent increases the likelihood of its having access to an overdraft facility by almost 15 percentage points [or 24 per cent based on the mean of the dependent variable], holding all other right-hand side variables constant. This may not seem to be a very large effect, but it is important to know that the mean firm size is 98 employees [in other words, the mean firm is a large one] and that most firms of this size have an overdraft facility already.<sup>17</sup> In order to get the right perspective of a 100 per cent increase in firm size, it should be noted that 47 per cent of the observations used in the regressions are firms with less than 21 employees. Of these, about 50 per cent of the firms are ones with less than 6 employees. Hence, if evaluated at the median the marginal effect of a 100 per cent increase in firm size would most likely be much higher.

If the firm is classified as being formal [as opposed to being informal] access to an overdraft facility is 25 percentage points higher. This is an economically important effect and indicates, for credit purposes, the unfavourable situation of staying outside the legal system. The superior financial infrastructure in Nairobi and Mombasa does not seem to outweigh the advantage of close connection between lenders and borrowers. In relatively smaller cities [in this case Nakuru and Eldoret] it is likely that banks are more familiar with potential borrowers and thus the lender has better information about

the borrower. In the anonymity of a big city, adverse selection and moral hazard are likely to pose problems. The big advantage of being located in a relatively small city is evidenced by the large parameter of such a location. Firms in Nakuru and Eldoret have 35-percentage points [56 per cent] greater probability of obtaining short-term credit than firms in Nairobi or Mombasa. However, since only 19 per cent of the firms are located in Nakuru or Eldoret, one may need to exercise some caution in interpreting the parameter of location.

Firms that deal in international markets are more likely to have an overdraft. An increase in the proportion of imported raw materials by one percentage point [from 18 to 19 per cent] increases the probability of having a short-term loan by 39 percentage points [63 per cent]. This large effect is somewhat surprising given the study by United Nations Development Programme [UNDP]/World Bank, 1993], which suggested that exporting firms were perceived to be greater risks than those oriented towards the domestic market only. However, it is possible that the proxy chosen for outward-orientation explains the large parameter in a trivial fashion, since overdraft facilities are normally used for working-capital purposes. This issue is further discussed in the section on robustness-checks.

The next point of interest is the amount of short-term credit. Here the suggestion is that firm size plays a lesser role than for access to an overdraft facility. One possible explanation for this result is that screening is mainly undertaken for determining whether or not a firm is creditworthy. Once the decision that credit will be extended has been taken, monitoring of how the money is used is more important for the amount decision than the amount itself [at least when the borrowed amount is not unreasonably large given the firm- and project characteristics]. An increase in firm size by 100 per cent increases the share of overdraft in total debt by about four percentage points [about 15 per cent].

However, other variables have larger effects. If the firm has a formal status, the share of overdraft in total debt is 18 percentage points [67 per cent] higher than if the firm is informal. Location in a big city is negatively related also to the amount of short-term credit. Firms in relatively large cities have an overdraft ratio that is 12 percentage points [44 per cent] smaller compared with firms in relatively small cities. The reason for this result may be that once a loan has been given, it is in a relatively small city easier to monitor how the loan is used and this reduces the problems of moral hazard. Outward-orientation is negatively related to the amount of short-term borrowing [at the 10 per cent level of statistical significance, but not statistically significant in the RE Tobit], a result that corroborates the findings in UNDP/World Bank [1993].

A 100 per cent increase in firm age is associated with a decrease of five percentage points in the share of short-term credit. The coefficient of firm age is somewhat surprisingly negative and might indicate that its usefulness as a proxy for repeated interaction is limited. At least, the importance of repeated interaction seems dwarfed by the predominant use of short-term credit by relatively young firms, which might be an indication that young firms have to substitute long-term borrowing with short-term ones.

While ethnic origin of the owner did not enter the “access” regression, ethnicity seems to matter for the amount of short-term credit. African-owned firms obtain a share in overdrafts, which is smaller by 13-percentage points than that of the reference group “Other”. This result contrasts with, for example, Fafchamps [2000], who did not find any effects of ethnicity.<sup>18</sup> There is also a hint that the profitability of a firm may be negatively associated with how much short-term credit a firm chooses to borrow [the parameter is statistically significant at the 10 percent level]. This result might suggest pecking-order behaviour [see, for instance, Myers, 1984]. A 10 per cent increase in profitability per employee decreases the overdraft debt ratio by six percentage points.

Enforcement mechanism proxied with tangible assets enters with a hard to explain negative sign, although the parameter is not statistically significant in the RE Tobit. The parameters of the time dummy variables indicate that access to overdraft facilities was lower in 1994 compared with the previous year. This result is somewhat surprising in the light of financial-sector reform, which one would expect to at least not diminish credit supply. But, as mentioned earlier in the paper, the time-dummy variables are unable to capture the extent to which banks have increased the share of good loans to bad loans. Anyhow, a plausible explanation for the negative parameter can most likely be found in the adverse macroeconomic conditions that prevailed in Kenya in 1994. These adverse conditions deepened the distress into which the financial system had already been cast, mainly due to bad loan portfolios. This will be a recurring theme throughout this section, emphasized even more strongly in the case of long-term borrowing. Finally, it is interesting to note that market conditions [proxied by capacity utilization] appears to be of negligible importance once other factors have been controlled for.

The results pertaining to long-term borrowing are presented in Table 5. Since heteroscedasticity does not seem to pose a serious problem for the probability of having a long-term loan, the RE Probit can be used to indicate statistically significant parameters. Profit, firm size, firm status, ethnicity and

location are suggested by the RE Probit to be interesting variables in explaining access to long-term borrowing. For magnitudes of parameters, attention is paid to the marginal effects obtained from cross-section estimation.

In accordance with the theory of the pecking-order principle of firm financing, the parameter of profit enters with a negative sign. An increase in profit by 100 per cent decreases the likelihood of getting a formal loan by two percentage points [six per cent]. Larger firms have a larger probability of obtaining formal credit than do relatively small ones. A 100 per cent increase in firm size is associated with a five-percentage points [15 per cent] higher likelihood of having a formal long-term loan.

As for overdraft facilities, location in relatively small cities again has a strong positive effect on the access to long-term finance. Being located in a big city decreases access to long-term credit by 15 percentage points [45 per cent]. A very large effect is obtained from firm status, where formal firms have a 27-percentage point [80 per cent] higher access to formal credit than informal firms. This result suggests that in principle only formal firm obtain formal long-term loans.

Interestingly, African-owned firms have a higher, not lower, likelihood of getting formal long-term credit than firms owned by non-Africans and non-Asians. The effect is as large as 35 percentage points. Again, this result contests the results of, for example, Fafchamps [2000]. Moreover, it casts serious doubts on the view that African-owned firms are more likely discriminated against in the credit market compared with other ethnic groups. There is also some indication that Asian-owned firms have better access than have non-Africans and non-Asians, although in the RE Probit the parameter is not statistically significant.

The cross-section results also suggest that firm with collateral [tangible assets] have better access to formal loans, but again the parameter is not statistically significant in the panel estimation. Finally, over time, access to long-term credit appears to have weakened significantly. Access in the third year is 12 percentage points lower. As for overdrafts, adverse macroeconomic conditions seem to outweigh the potential positive effects of financial liberalization, although one has to be careful when interpreting the impact of time dummy variables.

For the amount of long-term loan, in principle the same explanatory variables are pointed at. Relatively profitable firms borrow smaller amounts than do relatively unprofitable ones. Again, this result supports the notion of pecking order financing. Larger firms borrow more, but the effect is not very strong. A 100 percent increase in firm size is only associated with about a two-percentage point

larger share of long-term borrowing. Firm-size effects are clearly dwarfed by, for instance, the ability to pledge collateral.

An increase in the share of tangible assets in total assets [from 45 to 46 per cent] increases the share of long-term credit [in total debt] a firm obtains by about 10-percentage points [67 per cent]. This is an economically large effect and may suggest that legal contract-enforcement mechanisms after all are at work in Kenya. In addition, it points to the importance of being able to offer some sort of security in order to obtain long-term loans. If a firm has a formal status, it gets to borrow 22 percentage points more long-term credit compared with informal firms. African-owned firms not only have better access to formal long-term credit, they are also able to borrow more as a share of total debt than are Asian or “Other”-owned firms. Hence, any expectation of African-owned firms being discriminated against finds little support here.

In terms of magnitude, there is again a large difference between being located in a big or small city [four percentage points or 27 per cent]. Finally, not only has access to long-term financing diminished, but the amount a firm can borrow on a long-term basis has also decreased.

In conclusion, what counts for a firm that needs to borrow for investment in real capital is the ability to offer some sort of security. In addition, African owners seem to have better access to long-term formal credit and get to borrow a larger amount than do other firms. Firms in smaller cities appear to have better contact with the lenders and lenders thereby have better a priori information about the firms. Furthermore, the ability to monitor what the loan is used for is greater in smaller communities. A firm that is licensed [i.e. formal] has an advantage over an informal firm because such a firm status has enabling information content. Variables related to repeated interaction, skill, demand conditions, reputation and outward-orientation are of less relevance to the long-term credit supply decision.<sup>19</sup>

## **V. CONCLUSIONS**

This paper has studied what factors influence the banks’ decisions to extend short- and long-term finance to manufacturing firms in Kenya. A theoretical model explaining under what circumstances a loan contract can be agreed upon laid the basis for the empirical work. A three-year panel dataset of more than 200 Kenyan manufacturing firms was used for the descriptive and multivariate analyses.

The descriptive analysis indicated that firm status [formal and informal firms] plays a chief role for whether a firm obtains formal-sector credit or not. Among formal firms, different ethnic groups

seem to favour different time horizons in borrowing. Asian-owned firms tend to borrow on short-term, while African-owned ones favour long-term borrowing. Relatively large firms have considerably more outstanding debt, but the differences measured as formal borrowing in total debt were not significant across firm size.

Almost all loans require some sort of collateral, but there appear to be a few exceptional cases where firms that cannot offer any security still obtain loans. Collateral tends to be several times the borrowed amount, while interest rates charged also seem to follow a kind of “ability-to-pay” pattern. The feeling among firms is that access to formal credit over time has not improved despite financial-sector reform. Furthermore, costs associated with both short- and long-term borrowing are perceived to be very high. There is a tendency for firms with African owners and for relatively small firms to state that access to credit is difficult, but the multivariate analysis showed that this is true only for short-term credit. The answers about costs associated with borrowing essentially follow similar lines.

Multivariate analysis of overdraft borrowing indicated that firm status and firm size, and to some extent location in a small city and outward-orientation, increase both the access to such borrowing and the amount a firm gets to borrow. Regarding long-term finance, there is considerable support for the idea that firms prefer internal to external borrowing [the pecking-order principle]. Also true for long-term finance is the fact that firm size, location, and firm status matter, but additional determinants are the ability to pledge collateral and ethnic factors.

Since type of borrower seems to play such a big role in the lending decision, one can conclude that information costs of whether a project is bankable or not, and monitoring costs after the loan has been extended, are quite high. Large formal firms signal low risk and the expectation that the firm’s intended investment will pay off compared with an investment project proposed by a small firm. In an economy where contract enforcement is uncertain due to a weak legal system, risk-aversion of banks outweighs the expected profit of seeking up the most profitable projects [because the search costs are so high]. Preference for lending to formal large firms indicates that reputation plays a principal role, but it also suggests that banks tend to take the safest routes.

Information and monitoring costs are mitigated by the proximity of lenders and borrowers. Such proximity allows banks to monitor the use of credit. It works in a fashion similar to the relationship between a village moneylender and borrower, or the one between a landlord and a tenant. While policy cannot affect the geographical proximity between lenders and borrowers, improving information flows

and increasing the transparency of firms' accounting could shorten the abstract distance between lenders and borrowers. Hence, this seems a promising area where reform can make a difference.

Strengthening of the legal system so that contracts can be enforced with a high degree of certainty ensures the validity of collateral. Property rights must be secured and there is most likely need for reform in this area as well. Corruption tends to jeopardize trust in the legal system.

Until the financial system is able to work under conditions of macroeconomic stability, support from an impartial and fair legal system and enhanced information flows, exaggerated risk-aversion can be expected to prevail. As long as that continues, only firms that are already prospering will obtain formal finance. Other firms will have to seek alternative ways to finance their investment and working capital. Under such circumstances, the manufacturing sector, which is dominated by relatively small firms, cannot be expected to play a leading role in Kenya's outreach for economic development, improved welfare and reduced poverty.



## NOTES

<sup>1</sup> There is ample evidence, at the aggregate level, that financial-sector development is an integral part of, and possibly also causes, economic growth [e.g. Beck and Levine, 2001; Rousseau and Wachtel, 2001; King and Levine, 1993a, b].

<sup>2</sup> Lack of access to external finance can explain why it takes so much time for manufacturing exports to catch up with the opportunities provided by relative price changes that favour of international competitiveness. This, in turn, provides an explanation for the slow structural adjustment often witnessed in the region [Steel and Webster, 1991]. Collier and Gunning [1999] describe how financial issues, in general, are related to economic performance in Africa.

<sup>3</sup> Although all six countries covered in Bigsten et al [2001] were part of the same World Bank project, the questions asked were not identical across the countries. As a consequence, only information available for all countries is included in the six-country dataset.

<sup>4</sup> Signalling refers to the costly acquisition of an inherently meaningless characteristic. Discrimination can be with respect to religion, race, sex, and firm size as well as to many other characteristics.

<sup>5</sup> It is essential to note that the model and the accompanying discussion to an overwhelming extent are based on Fafchamps, Pender and Robinson [1995]. Other excellent sources of such models are Hart [1995], Hart and Holmström [1987] and Kreps [1990]. Wonderful applications on the thematic spirit of contract theory for the case of developing countries are found in Bardhan and Udry [1999] and Ray [1998], where simplicity is combined with a high degree of relevance.

<sup>6</sup> Equivalently, it may symbolize the cost of compliance with the contract.

<sup>7</sup> When  $\pi(-R, T, \varepsilon) = \infty$ , the borrower cannot comply and the contract is breached. If  $\pi(-R, T, \varepsilon) < \infty$ , the borrower could in theory comply, but equation (1) will not be satisfied. The borrower is able, but unwilling to pay.

<sup>8</sup> Thus, any possibilities of partial payment are ignored.

<sup>9</sup> As before, partial payments are ruled out.

<sup>10</sup> What years the data cover is not always obvious. While questions about outputs and inputs clearly refer to “last year”, questions about finance are about “current outstanding balance”, i.e. “this year”. 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 at least partly rectified this way. Since current

outstanding debt is at focus in this paper it seems reasonable to refer to the years when the interviews were undertaken.

<sup>11</sup> A World Bank multi-country study finds that, after controlling for borrower characteristics, firms in developing countries use less long-term debt than their counterparts in developed countries [Caprio, Jr. and Demirguc-Kunt, 1998].

<sup>12</sup> Other ethnic origin is essentially composed of owners from Europe or the Middle East.

<sup>13</sup> This provides some support for the proposed substitution [between formal credit and trade credit] hypothesis in Demirguc-Kunt and Maksimovic [2001].

<sup>14</sup> To be sure, the interpretation of the effects of ethnic origin is not straightforward. Raturi and Swamy [1999] decompose the probability that a firm is credit constrained into the probability that a firm wants credit, given this that it applies for a loan, and that it is denied a loan. The authors then show that firms owned by Africans are more likely to be credit constrained, but not because they are denied external finance to a larger extent than are other types of firms. Instead, the result is driven by a greater probability that African-owned firms want loans. In the present paper, the effect of ethnicity is even more significant in the case of long-term finance, but the parameter of African ownership turns out to be positive, not negative.

<sup>15</sup> The inability to correct for heteroscedasticity in the panel estimations is most likely the prime source for differing results.

<sup>16</sup> While it is likely that a lender uses firm size as a “short-cut” to the lending decision, one has to be somewhat cautious regarding the magnitude of the parameter. The reason is that every loan has a fixed cost attached to it. The larger the loan the smaller is the share of the fixed cost in the loan. Everything else equal, independent of the information value in firm size, a bank might, therefore, be more interested in lending to a large borrower than to a small one.

<sup>17</sup> In order to simplify the discussion here, firm size is measured by the number of employees, which is highly correlated with sales.

<sup>18</sup> A test of whether the parameter of African ownership can be said to statistically differ from the one pertaining to Asian ownership supports the view that ethnicity matters for enterprise financing. This results holds for all estimations undertaken.

<sup>19</sup> Several checks for the robustness of the results were carried out. First, the regressions were re-estimated with slightly different definitions of the dependent and independent variables. Second, a few candidate explanatory variables not previously included were tested for their influence on the likelihood of obtaining formal credit and the amount of credit obtained. Finally, the results were also checked for different reporting frequency of results [e.g. annual or monthly]. Two variables, outward-orientation and location in a big city, appear sensitive to alternative definitions of variables and reporting frequencies. Regarding the other results obtained in Section 4.3, it seems fair to conclude that they are robust to the tested alternatives. More detailed results of these checks can be obtained from the author upon request.

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

<b>Inflow of Funds</b>	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	19.20	42.00	23.04	28.84	29.24	40.49	36.87	36.25	6.94
loans									
Long-term formal	32.22	17.87	20.17	26.63	18.60	20.74	20.04	20.35	9.96
loans									
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
<b>N</b>	<b>74</b>	<b>257</b>	<b>36</b>	<b>19</b>	<b>75</b>	<b>142</b>	<b>122</b>	<b>359</b>	<b>63</b>

*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. 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.

*Source:* Own calculations.

**Table 2.** The incidence of external finance, 1993-95

Proportion 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
<b>N</b>	<b>102</b>	<b>310</b>	<b>48</b>	<b>36</b>	<b>103</b>	<b>168</b>	<b>143</b>	<b>452</b>	<b>172</b>

*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.

*Source:* Own calculations.



**Table 3.** Mean and median collateral and interest rates, 1993-95

	African	Asian	Other	Micro	Small	Medium	Large	Formal	Informal
<b><i>Frequency of Collateral</i></b>									
Bank loans	100.00	93.60	100.00	36.80	61.70	92.70	96.60	95.90	90.00
(N)	(34)	(78)	(10)	(7)	(16)	(41)	(58)	(123)	(10)
NBFI loans	81.80	71.90	100.00	100.00	62.50	75.10	81.30	73.30	100.00
(N)	(11)	(32)	(1)	(1)	(8)	(20)	(16)	(45)	(3)
<b><i>Mean and Median Collateral as a share of loan</i></b>									
Bank loans	4.30	6.86	2.70	2.36	6.08	5.49	6.21	5.75	9.29
(Median)	(2.94)	(3.53)	(1.88)	(1.92)	(5.00)	(2.50)	(3.00)	(3.02)	(2.27)
(N)	(33)	(77)	(11)	(6)	(16)	(40)	(59)	(122)	(9)
NBFI loans	0.70	3.66	-----	-----	1.00	1.90	4.48	3.10	-----
(Median)	(0.70)	(2.00)	(-----)	(-----)	(1.00)	(1.67)	(2.25)	(1.90)	(-----)
(N)	(2)	(15)	(0)	(0)	(2)	(5)	(10)	(17)	(0)
<b><i>Mean and Median Interest rate</i></b>									
Bank loans	17.94	21.54	18.83	11.58	20.92	21.00	21.20	20.48	15.50
(Median)	(18.00)	(21.00)	(18.00)	(8.25)	(20.00)	(19.00)	(21.00)	(20.00)	(18.00)
(N)	(26)	(68)	(6)	(6)	(12)	(33)	(49)	(101)	(6)
NBFI loans	23.00	20.96	-----	20.00	22.33	21.63	20.00	21.25	21.00
(Median)	(22.00)	(19.00)	(-----)	(20.00)	(22.50)	(20.00)	(19.00)	(20.00)	(21.00)
(N)	(7)	(23)	(0)	(1)	(6)	(16)	(9)	(32)	(2)

N stands for number of observations [in italics].

Source: Own calculations.

**Table 4.** Explaining overdraft borrowing, 1993-95

	CS Probit	Marginal Effects	RE Probit	CS Tobit	Marginal Effects	RE Tobit
Constant	-2.415*** (2.897)	-1.740*** (4.148)	-7.023** (2.366)	-0.570* (1.791)	-0.252* (1.933)	-0.517 (1.454)
Log Firm age	-0.091 (1.204)	-0.066 (1.261)	-0.256 (0.773)	-0.123*** (2.712)	-0.054*** (2.676)	-0.101* (1.651)
Log Profit per employee	-0.036* (1.739)	-0.015 (0.715)	-0.031 (0.833)	-0.013* (1.832)	-0.006* (1.846)	-0.014** (2.176)
Log Sales	0.202*** (3.693)	0.145*** (6.688)	0.539*** (3.625)	0.083*** (4.687)	0.037*** (5.279)	0.062*** (3.104)
Capacity Utilization	0.037 (0.767)	0.027 (0.789)	0.166 (1.237)	0.022 (1.057)	0.010 (1.058)	0.034** (2.138)
Tangible Assets	0.035 (0.209)	0.025 (0.209)	-0.318 (0.452)	-0.288*** (2.626)	-0.127*** (2.708)	-0.135 (1.278)
Educational level of staff	0.026 (0.163)	0.018 (0.163)	0.180 (0.276)	-0.167 (1.611)	-0.074 (1.621)	-0.038 (0.375)
Promotion-sales ratio	0.082 (1.182)	0.058 (1.198)	0.259 (0.566)	-0.686 (0.380)	-0.003 (0.379)	-0.004 (0.020)
Formal firm	0.347* (1.858)	0.250** (2.042)	1.533* (1.769)	0.412*** (2.716)	0.182*** (3.017)	0.342** (2.440)
African owner	-0.119 (0.595)	-0.086 (0.602)	-0.525 (0.358)	-0.289** (2.406)	-0.128*** (2.413)	-0.178 (1.060)
Asian owner	0.227 (1.249)	0.163 (1.320)	0.993 (0.685)	0.158 (1.616)	0.070 (1.612)	0.237 (1.625)
Location in Nairobi or Mombasa	-0.491*** (2.911)	-0.354*** (3.784)	-1.502** (2.215)	-0.321*** (4.179)	-0.142*** (4.391)	-0.298*** (3.129)
Outward-orientation	0.544* (1.907)	0.392** (2.282)	2.220** (2.097)	-0.158* (1.694)	-0.070* (1.721)	-0.020 (0.166)
Food	0.184 (1.201)	0.132 (1.272)	0.793 (1.029)	-0.032 (0.396)	-0.014 (0.395)	0.074 (0.703)
Wood	0.071 (0.509)	0.051 (0.509)	0.173 (0.236)	-0.113 (1.170)	-0.050 (1.173)	0.007 (0.060)
Textile	0.174 (1.184)	0.125 (1.199)	0.122 (0.163)	0.022 (0.274)	0.010 (0.274)	0.068 (0.622)
1994	0.013 (0.122)	0.009 (0.121)	-0.186 (0.546)	-0.165** (2.475)	-0.073*** (2.546)	-0.139*** (2.799)
1995	-0.148 (1.235)	-0.107 (1.318)	-0.700 (1.601)	-0.020 (0.308)	-0.009 (0.309)	-0.055 (0.853)
N / Firms	457/222	-----	457/222	454/221	-----	454/221
R <sup>2</sup> <sup>a</sup>	0.76	-----	0.90	-----	-----	-----
Log-Likelihood	-135.61	-----	-124.70	-249.05	-----	-235.45
Joint $\beta = 0$ <sup>b, c</sup>	338.00***	-----	190.95***	430.45***	-----	137.10***
Heteroscedasticity <sup>d, e</sup>	8.17***	-----	-----	15.97***	-----	-----
Sample selection <sup>f</sup>	0.35	-----	-----	-----	-----	-----
Pooled vs. Panel <sup>g</sup>	-----	-----	29.98***	-----	-----	43.16***
$\beta_{AFRICA} = \beta_{ASIA}$ <sup>h</sup>	4.80**	-----	5.95**	31.35***	-----	15.47***

Note: \*\*\*, \*\*, and \* indicate significance at 1 %, 5 %, and 10 % respectively. N = number of observations. Absolute t-values are in parenthesis. Marginal effects are evaluated at the variable means. CS = cross-section, RE = random effects.

<sup>a</sup> For Probit: Zavoina and McElvey's<sup>19</sup> pseudo R<sup>2</sup> <sup>b</sup> For CS Probit: Wald test of slope parameters jointly zero,  $\chi^2$ [df] <sup>c</sup> For RE Probit: Likelihood ratio test of slope parameters jointly zero,  $\chi^2$ [df]

<sup>d</sup> Likelihood ratio test of H<sub>0</sub>: No heteroscedasticity,  $\chi^2$ [df] <sup>e</sup> T-test of H<sub>0</sub>: Correlation coefficient  $\rho = 0$ , t[df] <sup>f</sup> Likelihood ratio test of H<sub>0</sub>: Pooled,  $\chi^2$ [df] <sup>g</sup> Wald test of  $\beta_{AFRICA} = \beta_{ASIA}$ ,  $\chi^2$ [df]

**Table 5.** Explaining formal long-term borrowing, 1993-95

	Probit	Marginal Effects	RE Probit	Tobit	Marginal Effects	RE Tobit
Constant	-3.373*** (4.420)	-1.152*** (4.514)	-5.140*** (4.423)	-1.829*** (4.231)	-0.499*** (5.353)	-1.358*** (3.234)
Log Firm age	-0.009 (0.075)	-0.003 (0.075)	0.034 (0.152)	-0.020 (0.356)	-0.006 (0.357)	-0.004 (0.049)
Log Profit per employee	-0.054*** (2.578)	-0.019*** (2.570)	-0.030*** (3.289)	-0.019** (2.001)	-0.005* (1.947)	-0.023** (2.318)
Log Sales	0.151*** (3.690)	0.052*** (3.705)	0.220*** (3.313)	0.061** (2.578)	0.017*** (2.785)	0.046* (1.748)
Capacity Utilization	-0.042 (0.658)	-0.014 (0.658)	-0.038 (0.399)	-0.036 (0.992)	-0.010 (0.981)	-0.039 (0.995)
Tangible Assets	0.546* (1.918)	0.187* (1.918)	0.506 (1.009)	0.382** (2.562)	0.104** (2.472)	0.356** (1.987)
Educational level of staff	0.115 (0.459)	0.039 (0.459)	0.052 (0.147)	0.002 (0.016)	0.001 (0.016)	-0.015 (0.125)
Promotion-sales ratio	0.014 (0.314)	0.005 (0.314)	0.053 (0.730)	-0.885 (0.449)	0.002 (0.449)	0.003 (0.134)
Formal firm	0.950*** (3.423)	0.274*** (4.308)	1.274** (2.381)	0.815*** (3.691)	0.222*** (4.362)	0.576*** (3.069)
African owner	0.998*** (3.129)	0.347*** (3.202)	1.275** (2.181)	0.408*** (2.691)	0.111*** (2.576)	0.493** (2.486)
Asian owner	0.508* (1.928)	0.171** (1.968)	0.562 (1.216)	0.196 (1.613)	0.053 (1.602)	0.237 (1.466)
Location in Nairobi or Mombasa	-0.424** (2.330)	-0.154** (2.243)	-0.705** (2.232)	-0.158* (1.736)	-0.043* (1.771)	-0.242** (2.075)
Outward-orientation	0.309 (1.220)	0.106 (1.218)	0.666 (1.600)	0.130 (1.075)	0.035 (1.064)	0.188 (1.216)
Food	-0.178 (0.835)	-0.059 (0.863)	-0.185 (0.503)	-0.037 (0.320)	-0.010 (0.319)	-0.023 (0.160)
Wood	0.073 (0.344)	0.025 (0.341)	0.030 (0.078)	0.107 (0.918)	0.029 (0.919)	0.102 (0.688)
Textile	-0.298 (1.452)	-0.097 (1.528)	-0.442 (1.184)	-0.161 (1.443)	-0.044 (1.443)	-0.079 (0.571)
1994	-0.251 (1.487)	-0.083 (1.533)	-0.399* (1.762)	-0.115 (1.378)	-0.031 (1.372)	-0.153** (2.057)
1995	-0.376** (2.166)	-0.122** (2.296)	-0.402 (1.632)	-0.209** (2.579)	-0.057** (2.521)	-0.202** (2.416)
N / Firms	456/221	----	456/221	454/221	----	455/221
R <sup>2</sup> <sup>a</sup>	0.52	----	0.63	----	----	----
Log-Likelihood	-232.43	----	-217.69	-248.65	----	-245.31
Joint $\beta = 0$ <sup>b, c</sup>	115.64***	----	102.27***	209.01***	----	95.45***
Heteroscedasticity <sup>d, e</sup>	1.31	----	----	11.20***	----	----
Sample Selection <sup>f</sup>	1.03	----	----	----	----	----
Pooled vs. Panel <sup>g</sup>	----	----	20.58***	----	----	17.88***
$\beta_{AFRICA} = \beta_{ASIA}$ <sup>h</sup>	5.69**	----	4.06**	4.57**	----	4.43**

Note: \*\*\*, \*\*, and \* indicate significance at 1 %, 5 %, and 10 % respectively. N = number of observations. Absolute t-values are in parenthesis. Marginal effects are evaluated at the variable means. CS = cross-section, RE = random effects.

<sup>a</sup> For Probit: Zavoina and McElvey's<sup>19</sup> pseudo R<sup>2</sup> <sup>b</sup> For CS Probit: Wald test of slope parameters jointly zero,  $\chi^2$ [df] <sup>c</sup> For RE Probit: Likelihood ratio test of slope parameters jointly zero,  $\chi^2$ [df] <sup>d</sup> Likelihood ratio test of H<sub>0</sub>: No heteroscedasticity,  $\chi^2$ [df] <sup>e</sup> T-test of H<sub>0</sub>: Correlation coefficient  $\rho = 0$ , t[df] <sup>f</sup> Likelihood ratio test of H<sub>0</sub>: Pooled,  $\chi^2$ [df] <sup>g</sup> Wald test of  $\beta_{AFRICA} = \beta_{ASIA}$ ,  $\chi^2$ [df]