Ethnicity and Credit in African Manufacturing[1]

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Abstract

This paper investigates whether market interaction can, by itself, perpetuate the lack of ethnic diversity that is observed in the business communities of many developing countries. Using case study data on manufacturing firms in Kenya and Zimbabwe, we find no evidence that blacks or women are disadvantaged in the attribution of bank credit once we control for firm size and other observable characteristics. In contrast, an ethnic and gender bias is noticeable in the attribution of supplier credit. Although we cannot rule out the presence of discrimination, the bulk of the evidence indicates that network effects play an important role in explaining this bias.

In many developing countries, the ethnic makeup of local business communities is quite different from that of the population at large. It is not uncommon for members of a particular ethnic or religious group, or even for residents of foreign origin, to account for an overwhelming proportion of entrepreneurs (e.g., Bigsten et al. (1998)). The historical record too is replete with examples of a particular ethnic group dominating commerce for extended periods of time (e.g., Braudel (1986), Greif (1993, 1994)). Accounts by historians, anthropologists and sociologists also demonstrate that the ethnic and religious background of dominant business groups varies considerably from place to place (e.g., Geertz, Geertz and Rosen (1979), Geertz (1963), Amselle (1977), Staatz (1979), Cohen (1969), Meillassoux (1971), Bauer (1954), Jones (1972)). It even varies across economic activities within the same country.[2] Lack of business diversity is *a priori* inefficient: drawing entrepreneurs from a small talent pool reduces the average quality of local entrepreneurship. It is also inequitable as it leads to income disparities between groups that inevitably fuel political tension (e.g., Himbara (1994), Marris (1971)). Animosity toward prosperous ethnic or religious groups may, in turn, serve as investment disincentive if members of the group fear being subsequently expropriated. Such fears are not baseless, as the historical record demonstrates.[3]

Colonial policies[4] and other historical and political factors have often favored particular ethnic groups and communities, enabling them to gain a dominant position in a particular segment of economic activity. These factors, however, do not explain why ethnic concentration persists long after favorable factors and policies have been removed. The post-independence experience of many African countries, for instance, suggests that, once a group has established a dominant position in an activity, it can retain its advantage long after initially favorable

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[2] The fish trade in Kenya, for instance, is dominated by the Luos, while textile manufacturing is largely in the hands of Kenyan-Asians.

[3] E.g., the expulsion of Asians from Uganda in the 1970's or, more recently, the looting of ethnic Chinese shops in Indonesia.

[4] Including those of the white-dominated government of the Unilateral Declaration of Independence era in Zimbabwe.

conditions have been eliminated -- and even after having been actively combatted by post-colonial governments.[5] Similar questions have been raised in the U.S. regarding the survival of ethnic disparities between blacks and whites after the removal of explicit discrimination (e.g., Yinger (1998), Loury (1998)). Ethnic concentration appears to be self-sustaining, at least under certain conditions. The objective of this paper is to investigate whether market interaction can, by itself, perpetuate a lack of ethnic diversity in business.

To achieve our purpose, we examine the role that group membership plays in participation to market exchange and in access to supplier and bank credit. Using data from manufacturing firms in two African countries, we provide preliminary evidence regarding the respective roles of ethnicity and networks in the establishment of business trust. After a brief description of our conceptual framework, we examine the relationship between ethnicity and credit in Kenyan and Zimbabwean manufacturing. We uncover no evidence of ethnic or gender bias in the attribution of bank credit but our results show that blacks and women are disadvantaged in the attribution of supplier credit. Although we cannot rule out the presence of discrimination, the bulk of the evidence indicates that network effects play an important role in explaining ethnic bias. These results suggest that more emphasis should be put on policies that foster personal connections and information sharing between social and ethnic groups.

Section 1. Conceptual Framework

The interplay between trust, trade, and ethnicity or religion has long been recognized. It has, for instance, been argued that Islam penetrated the East African interior due to coastal merchants' preference to deal with Muslims (e.g., Ensminger (1992), Shillington (1989)). Sociologists have similarly emphasized that African entrepreneurs prefer to do business with members of

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[5] In the late 1960's, the Kenyata government actively favored the transfer of Asians businesses to ethnic Kenyans, particularly Kikuyus, with very little success (e.g., Himbara (1994)). Similar policies have been pursued, although less forcefully, by the Mugabe administration in Zimbabwe.

their own ethnic group (e.g., Marris (1971), Macharia (1988), Himbara (1994)). Together with a number of economists, they have emphasized the role that trust and reputation among individuals and communities play in creating an enabling environment for trade (e.g., Hart (1988), Coleman (1988), Granovetter (1985), Mitchell (1969), Platteau (1994), Greif (1993, 1994), Milgrom, North and Weingast (1991)). There is a growing consensus that sharing the same ethnicity and religion are elements that favor the establishment of trust (e.g., Gambetta (1988), Fukuyama (1995), Cornell and Welch (1996)).

Conceptually, there are several ways by which ethnicity may influence the allocation of credit, e.g, through taste for discrimination (e.g., Becker (1971), Akerlof (1985)), erroneous expectations or 'prejudice' (e.g., Yinger (1998)), difficulties of communication across cultural boundaries (e.g., Cornell and Welch (1996), Loury (1998)), statistical discrimination (e.g., Arrow (1972)), and network effects (e.g., Saloner (1985), Montgomery (1991), Taylor (1997)). There is widespread disagreement as to the relative empirical contributions these mechanisms make to ethnic and gender bias in labor and credit markets.[6] Becker (1971), for instance, has argued that prejudice and taste for discrimination are costly and should result in lower profits. In a competitive environment, he argues, firms that discriminate on the basis of taste or maintain erroneous expectations should, in the long run, be competed out by more open-minded, better informed businesses. Becker's view has not gone unchallenged, however.[7]

Unlike prejudice and tastes, statistical discrimination is perfectly compatible with the profit-seeking motive and cannot, therefore, be competed out. Whenever firms cannot assess clients and suppliers directly, it is rational for them to screen on the basis of whatever observable

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[6] See Donohue (1998), Darity (1998), and the Spring 1998 issue of the Journal of Economic Perspectives for recent surveys of the literature in the U.S.

[7] As pointed out by many (e.g., Donohue (1998), Darity and Mason (1998)), the idea that market forces should eliminate discrimination and prejudice relies critically on the assumption that markets are competitive. In the U.S. South during the Jim Crow era, Donohue emphasizes that employers who hired blacks were ostracized by the white-dominated establishment and feared being targeted by the Ku Klux Klan. In such circumstances, the author argues, market forces could not operate and, without external intervention, discrimination could have perdured indefinitely. Becker's view has been used to oppose affirmative action in the U.S.

information they can collect. If groups of different race or gender differ in unobservable attributes, statistical discrimination will arise. The role that it plays in explaining actual ethnic bias has, however, been the object of much debate. In addition, the presence of statistical discrimination is extremely difficult to prove since it requires the econometrician to have as much if not more information about applicants than employers themselves (e.g., Darity (1998)).[8]

Network effects have received somewhat less attention in the discrimination literature, but they have long been studied in labor markets (e.g., Granovetter (1995)). The basic idea is that information about opportunities for exchange and agents' types circulates along interpersonal networks. People talk with their friends and professional acquaintances about jobs, bad payers, and arbitrage opportunities, and they refer job and credit applicants to each other. In such environment, individuals with better networks collect more accurate information, which enables them to seek out market opportunities more aggressively and to better screen prospective employees and credit recipients. A rapidly growing literature has modeled these processes and has shown that, in a world of imperfect information, they provide an economic advantage to better connected agents (e.g., Fafchamps (1998), Taylor (1997), Kranton (1996)).

To the extent that members of a particular group cultivate close links with each other, be it for historical or cultural reasons,[9] the group will be seen to perform better than others in market exchange. If this group recruits its members primarily along ethnic or gender lines, ethnic or gender bias will occur although, strictly speaking, agents need not have a taste for discrimination and they need not rely on statistical discrimination.[10] Network effects thus puts the emphasis on patterns of socialization as an alternative explanation for ethnic or gender bias.[11] The primary

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[8] As much information to interpret a significant sign of race in a wage regression as evidence of discrimination; more information to demonstrate that unobservable attributes vary systematically with race or gender.

[9] E.g., persecution.

[10] In statistical discrimination models, ethnic bias arises when two populations have different hidden characteristics. In network effects, ethnic bias may arise even when they have the same hidden characteristics, provided members of one group can more easily screen members of their own group AND one group has acquired a dominant position, perhaps for historical reasons.

[11] The concept of network effects bears some ressemblance with another explanation for ethnic bias based on the existence of a dominant group seeking to protect its supremacy. The difference is that network effects can arise in a

objective of this paper is to assess how much of the observed ethnic and gender bias in African enterprise credit can be attributed to network effects.

Our analysis focuses not only on bank credit but especially on supplier credit which has been shown to play an important part in firm finance (e.g., Fafchamps (1997)). At the core of our argument lies the recognition that normal commercial transactions require a temporal dissociation between delivery and payment, otherwise the conduct of business would be too unwieldy. Market transactions thus normally encompass an element of credit.[12] Because recourse to formal collateral is impractical for most business transactions, trade credit gets allocated essentially on the basis of trust (e.g., Fafchamps (1996a, 1997), Fafchamps et al. (1994)). Trade credit is thus typically offered on a selective basis; those who do not qualify must buy cash (e.g., Fafchamps et al. (1994), Fafchamps, Pender and Robinson (1995), Fafchamps (1996a, 1997)).[13] Since only very small firms can operate on a cash-only basis, how trust is established and with whom dictates not only how trade takes place but also which firms are able to operate in a business-like fashion and which must remain microenterprises. In addition, credit from suppliers is also an important source of finance for small and medium-size firms (e.g., Cuevas et al. (1993), Bade and Chifamba (1994), Fafchamps et al. (1994), Fafchamps, Pender and Robinson (1995)).[14] An examination of the process by which trade and bank credit are attributed is therefore expected to throw light on the ethnic composition of business communities.

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completely decentralized manner, that is, even in the absence of any collusion among members of the dominant group and without need for metapunishment (see, for instance, the discussion in Donohue (1998)). Of course, the presence of discrimination or of collusion to exclude members of other groups can coexist with network effects, and the existence of ethnic-based networks can facilitate collusion. The point is that the coexistence of ethnic bias and interpersonal networks does not, by itself, imply collusion.

[12] The duration of trade credit is normally defined as the time elapsed between invoicing and payment. In developed countries, this delay typically ranges between 30 to 60 days (e.g., Schwartz (1974), Schwartz and Whitcomb (1979)). Similar delays were found among African manufacturers (e.g., Cuevas et al. (1993), Bade and Chifamba (1994), Fafchamps et al. (1994), Fafchamps, Pender and Robinson (1995)).

[13] In this paper, we use the phrase 'cash payment' to designate payment in currency or certified check at the time of delivery. Accepting a payment by check is about as risky as granting credit and is considered as such here. In the business world, payment for materials and inputs out of petty cash is extremely rare, except for very small infrequent purchases. One of the reasons is that large movements of cash are unsafe. Among businesses, the word 'cash' is often given a meaning different from the one used here, i.e., to refer to early payment.

[14] Although trade credit is formally considered short term financing, it is normally renewed with each order so that, in practice, it provides firms with a long term source of working capital.

The difficulty is to disentangle discrimination from network effects, since they can both generate ethnic bias in the attribution of credit and, to the extent that networks are based on ethnicity, both grant one particular ethnic group an economic advantage. Their testable implications differ in two important dimensions, however. First, if networks do not matter, possible access to business information through socialization and screening methods should not affect how firms get and give credit. In contrast, if network effects are present, better access to information should help predict which firms get and give credit. Second, if bias is the result of statistical discrimination, firms who are discriminated against will themselves discriminate among their clients. To the extent that all firms face the same pool of potential clients, the ethnicity of a firm's owner or manager should then help determine whether the firm gets credit but not whether it gives credit to its clients.[15] In contrast, if ethnicity is correlated with network affiliation, and if bias is the result of network effects, then insider firms should find it easier not only to be recognized by suppliers, but also to identify reliable clients. In this case, ethnicity should explain not only whether firms get credit, but also whether they grant credit to clients.[16] The same holds for gender bias. These testable implications form the basis of our empirical analysis.

Section 2. The Data

We use data from two surveys of enterprise finance in African manufacturing conducted under the auspices of the World Bank and coordinated by the Regional Program for Enterprise Development of the African Technical Division. The first survey was undertaken in September 1993 in Nairobi, Kenya; the second took place in August 1994 in Harare, Zimbabwe (see

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[15] In contrast, if discrimination is due to 'taste', firms should favor members of their own ethnicity and one should observe the reverse effect (e.g., Darity and Mason (1998)). By comparing the provision and attribution of credit, this test is less subject to the criticism that affects standard 'tests' of discrimination which regress, say, wages or credit received on observable characteristics and race (e.g., Heckman (1998), Darity (1998)).

[16] The validity of the test rests on the assumption that credit reliability is not itself a determinant of the willingness to grant trade credit to clients. If this were the case, being discriminated against would be correlated with customer credit through unreliability. Given that all clients ask for credit, it is hard to believe that firms would fail to realize that granting credit to their clients helps their sales.

Fafchamps *et al.* (1994) and Fafchamps, Pender, and Robinson (1995)) for details). Close to 60 firms were interviewed in both countries, two third of which were randomly selected from two panels of 200 firms previously surveyed by World Bank teams. The remaining firms were selected among wholesalers and retailers operating in the same sectors. Both panels are made of manufacturers operating in textile and garment, food processing, wood products, and metal products industries. As a result of sampling design, they overrepresent small and medium size enterprises and underrepresent microenterprises (Bade and Gunning (1994)).[17] Since the former display the most variation in trade credit use, the data are particularly suited for our purpose.

The sectoral and ethnic composition of the two samples is given in Table 1. In both countries owners and managers of medium to large firm predominantly belong to a minority ethnic group. The ethnicity of the dominant business group, however, varies between the two countries. In Kenya, the bulk of surveyed firms are in the hands of ethnic Asians; in Zimbabwe, they are mostly managed by whites.[18] In both cases, these communities represent around one percent of the country's population. Such degree of ethnic concentration in medium to large scale enterprises is not unusual in Africa, although dominant business communities are not always of foreign origin (e.g., Bigsten et al. (1998)). In contrast, the overwhelming majority of microenterprises in Kenya and Zimbabwe are in the hands of ethnic Africans (e.g., Daniels (1994)).

Data were collected on a variety of issues pertaining to enterprise finance. A large number of questions were devoted to trade credit. Respondent were quizzed, for instance, on how they screen customers before granting trade credit, how they respond to late payment by clients, and how they seek enforcement of contractual obligations. Their responses were later coded into consistent categories. The data suffer from a number of shortcomings: the coverage and wording of

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[17] Daniels (1994) reports that, in Zimbabwe, enterprises of less than 5 employees represent around 95% of all enterprises of 50 employees or less; the corresponding ratio is 44% in our sample.

[18] Why it is Asians who dominate in Kenya and whites in Zimbabwe is undoubtedly the result of past policies that favored these two groups. These policies, however, have been discontinued since independence (1964 for Kenya, 1979 for Zimbabwe after 15 years under Iam Smith's white government).

individual questions vary somewhat between the two surveys; many observations are missing; and certain important pieces of information were not collected. The imperfect coverage of the data is partially compensated by the detailed qualitative information gathered during interviews, but more careful data collection is needed to confirm our results. The findings presented here should thus be considered as preliminary and illustrative only. In spite of these shortcomings, they provide a useful initial assessment, given the near total absence of data in this area.

Descriptive statistics are given in Table 2 for all firms and by ethnic group. Only 12% of sample firms are headed by women. There appears to be a strong correlation between ethnicity and firm size. Similar -- if not stronger -- correlations have been found in other studies (e.g., Daniels (1994), Bade and Gunning (1994), Himbara (1994)). Ethnicity is also correlated with the amount of trade credit the firm receives and gives and, to a lesser extent, with availability of bank finance. Black firms are less likely to socialize with their clients and suppliers than other firms, an indication that black entrepreneurs largely remain outside the main business network. Probably for this reason, mainstream firms are more likely than black firms to screen customers using some sort of information sharing, and less likely to investigate clients directly. Black firms are also less likely to be 'formal': fewer of them are registered, and they are less likely to request clients to fill forms.

Section 3. Multivariate Analysis

Table 2 indicates that ethnicity and credit are related, but a number of other factors -- firm size, sector of activity, susceptibility to liquidity problems -- may account for this relationship. To test for ethnic bias, we must rely on a multivariate analysis. To this effect, we begin by regressing the surveyed firms' proportion of purchases and sales made on credit on a series of firm characteristics thought to influence the supply and demand of trade credit, plus dummy variables measuring ethnicity and network effects. We also use limited information available on whether firms ever purchase from or sell on credit to first-time commercial partners, and on credit

terms and implicit interest in credit purchases. If statistical discrimination and network effects are absent, the latter variable should be non-significant.[19] The accuracy of the test for discrimination rests critically on the absence of omitted variable bias (e.g, Yinger (1998), Heckman (1998)). If suppliers observe certain characteristics of prospective clients that are not recorded in the data but are correlated with ethnicity, we may erroneously conclude that ethnicity matters.[20] To minimize this bias we include as regressors most of firms' easily observable characteristics, such as sector of activity, registered status, and subsidiary status, plus characteristics for which the econometrician probably has better data than creditors, namely the actual number of employees of the firm and its cash-flow history. Still, the possibility of omitted variable bias should be kept in mind before a significant coefficient on ethnicity or gender is taken as evidence of discrimination, as the work of Neal and Johnson (1996) reminds us.

The estimated regression for credit purchases is:

$$P_i = \gamma_0 + \gamma_1 X_i + \gamma_2 D_i + \gamma_3 N_i^S + e_i \qquad (1)$$

The dependent variable P_i is the proportion of purchases made on credit; it can take any value between and including 0 and 1. The vector X_i contains firm characteristics such as country, sector, legal status, and size. Vector D_i stands for ethnicity and gender, while vector N_i^S captures available information on network effects with suppliers. The error term e_i is assumed to be i.i.d. Equation (1) is estimated as a two-sided censored Tobit on the pooled data and on each country sample separately. Firm size is measured as the log of the number of employees (plus one). Given that firms with better access to trade credit may grow faster, we control for simultaneity bias by replacing firm size W_i by its predicted values from the following equation:

$$W_i = \lambda_0 + \lambda_1 X_i + \lambda_2 D_i + \lambda_3 N_i^S + \lambda_4 A_i + \lambda_5 A_i^2 + e_i \qquad (2)$$

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[19] As Heckman (1998) pointed out, such a test can only show whether discrimination has no effect on market outcomes. Discrimination by certain (but not all) individuals is quite compatible with the absence of market discrimination if individuals who are discriminated against can always choose to deal with non-discriminating firms.

[20] It would have been useful to obtain the information about surveyed firms that is publicized by the credit reference bureau operating in Zimbabwe. Similarly, it would useful to get access to the information banks have on surveyed firms. Unfortunately this information was not collected.

Equation (2) is run on each country sample separately. The age and age squared of the firm -- A_i and A_i^2 -- serve as identifying restrictions;[21] they are jointly significant and explain a large portion of the variation in firm size. Estimation results for equation (2) are given in appendix.

Given that Zimbabwe enjoys the presence of a formal credit reference bureau while Kenya does not, we expect the country dummy to be positive, reflecting the relative ease with which Zimbabwean firms screen trade credit applicants. Food products are typically perishable and turnover is fast, so that less trade credit may be offered in that sector (see Nadiri (1969), Schwartz (1974), Schwartz and Whitcomb (1979), Ferris (1981), Emery (1984)). Larger firms are expected to purchase a larger share of their inputs on credit since it would be inconvenient for them to operate on a cash basis. Firms that are registered and incorporated, and subsidiaries of large holding corporations are more likely to elicit suppliers' confidence than informal partnerships. A dummy variable is also included that takes the value of one if the respondent experienced severe cash-flow problems in the past. Presumably, incompetent firms are more likely to run into problems, not only because they are incompetent but also because they receive less credit, which makes them more vulnerable to shocks (e.g., Fafchamps *et al.* (1994) and Fafchamps, Pender, and Robinson (1995)). Having faced serious cash flow problems in the past is thus a signal of incompetence; if information on such occurences circulates, one should observe a negative relationship between past problems and current credit.

The regression of P_i on firm characteristics is shown in the first two columns of Tables 3, 3a and 3b for the pooled sample, the Kenya sample, and the Zimbabwe sample, respectively. Firms in the food and wood sectors receive significantly less credit than others. Large firms, registered firms, and subsidiaries receive more supplier credit, firms with cash-flow problems less. We then add ethnicity and gender dummies. Results are shown in the third and fourth columns of Tables

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[21] Although the age of the firm may have a small effect on access to credit for very young firm, the effect is likely to be much smaller than the effect of firm age on size (e.g., Hoogeveen and Tekere (1994), Risseeuw (1994)). When regressing access to trade credit on uninstrumented firm size and firm age (not shown), age is not significant.

3, 3a, and 3b. The coefficient on ethnicity is significantly negative in all three regressions; gender is significant in the pooled sample and in Kenya. Other things being equal, the share of credit purchases in total purchases is 27 to 35% percentage points lower for black firms, and 36 to 60% percentage points lower for female-headed firms. Although these results do not, *per se,* constitute evidence of discrimination, they nevertheless suggest that ethnicity and gender are obstacles to supplier credit irrespective of firm size. In fact, the effects of gender and ethnicity are so strong that the coefficient of firms size becomes non-significant in all regressions. The significant coefficient of firm size in colum 1 thus appears entirely due its correlation with ethnicity and gender (see Table 2). The country dummy also becomes significant: as anticipated, firms give out more trade credit in Zimbabwe than Kenya.

What remains unclear is why ethnicity and gender matter. To investigate this issue, we replace ethnicity and gender with network effects. Respondents were asked to describe their relationship with their suppliers and the extent to which they socialize during and outside business. From these responses, two dummy variables were created. The first one identifies firms that deal with suppliers in an entirely anonymous fashion; the second takes the value of one when the respondent socializes with suppliers outside business (e.g, through sporting events, community gatherings, religious celebrations). Respondents who socialize during business hours constitute the omitted category. Results show that entrepreneurs who socialize with suppliers receive significantly more trade credit in the pooled sample and in Kenya; in Zimbabwe, the effect is not significant, however. Network effects thus appear stronger in Kenya than Zimbabwe, a result in line with the absence in Kenya of a credit reference bureau that circulates credit worthiness information widely. When gender, ethnicity, and network variables are combined, results are more mixed, probably because of multicollinearity in the data (last two columns of Tables 3, 3a, and 3b): network effects are (jointly) significant in Kenya and Zimbabwe, but gender and ethnicity factors remain present. From this we conclude that gender and ethnicity influence access to

supplier credit in ways that are at least partly accounted for by network effects.

To further investigate the determinants of access to trade credit, we examine whether respondents ever receive instant credit from first-time suppliers. To do so, we run a probit regression similar to equation (1) on whether or not the respondent is usually offered credit by first-time suppliers. Results are shown in Tables 4, 4a, and 4b. Although less significant, they confirm that ethnicity and socialization play a role in accessing supplier credit.

Next, we examine whether payment terms vary with ethnicity. Results, reported in Tables 5, 5a, and 5b, suggest that size, sector of activity, and past cash flow problems influence the duration of supplier credit. Gender is not significant, but being black translates into shorter credit terms in the pooled data and in the Zimbabwe subsample. Network effects are significant and have the expected sign in the pooled sample and in Kenya, but they have the wrong sign in Zimbabwe. There, firms that deal anonymously with suppliers receive longer credit terms. One possible interpretation is that the presence of a credit reference bureau makes it possible for firms to deal at arms length.

We conduct a similar analysis on the implicit monthly interest rate charged by suppliers. Sectoral dummies control for various factors including the effect of the market power of suppliers on the likelihood of price discrimination.[22] To control for selectivity bias -- interest payments being observed only for firms receiving supplier credit -- we run a two-step Heckman procedure. The regressors that appear in equation (1) are used for the selection equation.[23] Due to the possible presence of omitted variable bias, the results must be interpreted with caution but they suggest that female-headed firms pay a higher implicit interest rate. Other variables are not significant.[24] We find, therefore, little evidence of discrimination in credit terms. This concludes

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[22] Unfortunately, we do not have data on the actual market power of suppliers in various sectors of activity.

[23] Since we do not dispose of truly convincing instruments -- a common problem in sample selection correction models -- identifying restrictions must be imposed in a somewhat *ad hoc* manner. We simply omit from the interest rate equation the variables that we think are less directly related to interest charges and focus on variables of interest such as size, ethnicity, and network effects.

[24] Discussions with respondents indicate that firms explicitly mention cash discounts only to clients who may take

our analysis of supplier credit received by suveyed firms.

Next we examine the determinants of bank credit in the form of both overdraft facilities and bank loans. We have information on whether firms have an overdraft facility -- by far the most common form of bank finance -- and whether they have ever received a bank loan. Probit regression results are summarized in Table 7, using the same regressors as for supplier credit. Results show that, in contrast to supplier credit, ethnicity and gender have essentially no effect on the use of bank loans and overdrafts once firm size is controled for. Network effects are significant, however: not socializing with bank staff has a strong negative effect on access to bank finance. Socialization with bank staff *outside* business also a negative effect on access to bank credit. What matter most for bank credit thus seems to be personal interaction of a business-like character. These findings provide little evidence of ethnic or community network bias in the attribution of bank credit in the two surveyed countries.

We now turn to the credit that respondent firms give to their clients. The estimated regression is:

$$S_i = \omega_0 + \omega_1 X_i + \omega_2 D_i + \omega_3 \hat{P}_i + \omega_4 \hat{O}_i + \omega_5 C_i + e_i \tag{3}$$

Independent variables X_i and D_i are as before, except that the legal status of the firm is dropped from X_i: there is no reason for it to influence firms' willingness to give credit. We expect Zimbabwean firms to sell more on credit because screening is facilitated by the presence of a credit reference bureau. Manufacturing firms in the sample seldom retail to final consumers; they are therefore expected to sell more on credit than trading firms. Firms in the food sector should offer less credit given that their output is perishable and turnover is fast. Large firms are anticipated to sell in larger quantities and thus to resort more to credit sales.

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advantage of them. They usuallly refrain from mentioning cash discounts to those who are very unlikely to pay early. Respondents argue that doing otherwise would weaken their position in price negotiations with the client. (See Fafchamps *et al.* (1994), Fafchamps, Pender, Robinson (1995), and Fafchamps (1997) for details.) If true, this attitude generates another form of sample selection bias that could explain why ethnicity and socialization are not significant.

As discussed at the beginning of this section, ethnicity should have no effect on credit sales if ethnic bias is solely the result of statistical discrimination. If, in contrast, it is due to network effects, then it should have a significant negative effect on the share of sales firms make on credit. Finally, the effect of ethnicity should be positive if discrimination is due to taste. As emphasized before, these tests are vulnerable to omitted variable bias. In particular, lack of working capital among black firms could generate a spurious correlation between ethnicity and S_i if not properly controlled for. Three additional variables are therefore included in equation (3) to control for access to working capital: $\hat{P}_i$, the share of purchases on credit, $\hat{O}_i$, whether the firm has a bank overdraft facility or not, and C_i, whether the firm experienced a serious cash-flow problem in the past. Firms that faced cash-flow problems in the past or which have difficult access to working capital finance are expected to offer less credit to their clients. Because of potential endogeneity bias, $\hat{P}_i$ and $\hat{O}_i$ are instrumented.[25] For $\hat{P}_i$, the instrumenting regression is given in the last column of Tables 3, 3a, and 3b. For $\hat{O}_i$, it is given in Table 7. In both cases, the identifying restrictions are the socialization variables, the registered business dummy, and the subsidiary dummy; the former are credit category specific, the latter should have no direct effect on credit sales.

Coefficient estimates for equation (3) are reported in Tables 8 and 8b.[26] The first set of regressions use firm characteristics X_i, plus gender and ethnicity D_i. As expected, manufacturing firms and large firms sell more on credit, firms in the food sector less. The Zimbabwe dummy has the correct sign but is non-significant. Gender appears to have no effect that is not already captured by other variables. Being black, however, has a significant and independent effect on credit sales. To test whether access to working capital influences credit sales, we reestimate equation

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[25] C_i is relative to a past event and can thus be regarded as predetermined. Our identifying restrictions rest on the continued assumption that incompetence is not directly correlated with the willingness to grant credit to clients. This implies that, were patterns of trade credit dictated by statistical discrimination, indicators of competence affecting access to credit should not affect the granting of credit *except* through their effect on the working capital of the firm.

[26] The number of valid observations was too small to compute meaningful estimates for Kenya alone.

(3) with $\hat{P}_i$, $\hat{O}_i$, and C_i but without gender and ethnicity. Results indicate that, as expected, access to working capital -- particularly supplier credit (overdraft finance is significant only in the pooled sample) -- influence customer credit: buying an additional 10 percentage points of one's inputs on credit translates into an additional 9.1 percentage points of credit sales. To control whether ethnicity is in fact capturing difference in access to working capital, we then reestimate equation (3) with ethnicity and working capital variables. Pooled sample results suggest that both factors are at work: the coefficient on ethnicity is significantly negative, while the coefficient on supplier credit remains positive and is very close to being significant. Signs are correct but coefficients are not significant in the Zimbabwe only regression, possibly because of smaller sample size and multicollinearity problems.

We also have information about socialization with clients (Zimbabwe only) and about the screening practices followed by respondent firms.[27] This information is used to construct one network variable N_i^C and four dummy variables T_i. The first of these dummy variables takes the value of one if the respondent requires clients to fill forms before granting trade credit. The second is one if the respondent uses some sort of information sharing mechanism to assess the reliability of prospective clients: e.g., credit reference bureau, references from members of the community. The third is one if the firm observes a client's purchase and payment behavior over a period of time before granting trade credit. The fourth take the value of one if the respondent investigates clients directly, for instance by visiting their home or place of work. The estimating equation becomes:

$$S_i = \omega_0 + \omega_1\, X_i + \omega_2\, D_i + \omega_3\, \hat{P}_i + \omega_4\, \hat{O}_i + \omega_5\, C_i + \omega_6\, N_i^C + \omega_7\, T_i + e_i \qquad (4)$$

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[27] Because screening procedures are chosen by respondents, they are potentially subject to endogeneity bias. We do not, however, dispose of suitable instruments that would predict the choice of screening method. Regressing screening variables on X_i, D_i and N_i^C indicates that very little of the variation in screening methods can be explained by observed firm characteristics. Qualitative information gathered in the field leads us to suspect that screening methods are largely dictated by the options available to individual respondents. Firms that are part of an information sharing network rely on it to screen clients; those that are not must rely on trial period or personal inspection. The use of a particular screening method thus serves as a precious, even if potentially biased, indicator of its availability to the respondent.

Variable N_i^C only exists for Zimbabwe. If information sharing truly helps screen reliable clients, firms that use reputation when screening should sell more on credit. In contrast, firms that must spend time and effort directly investigating clients instead of relying on their reputation should offer less credit to their customers. Formal procedures, by themselves, should make no difference unless they are used to directly assess the customer or to seek information from others.

Results, shown in the last columns of Tables 8 and 8b, indicate that screening methods are a major determinant of credit sales. Individual coefficient estimates are largely consistent with expectations: firms that rely on information sharing to screen prospective credit recipients sell an additional 36 to 39% of their output on credit relative to others; firms that must investigate clients directly sell 19 to 40% less of their output on credit. The latter results is consistent with the impression gathered from interviews that firms rely on direct screening only when they do not have access to information sharing. Lack of socialization with clients and the reliance on trial periods are associated with lower credit sales in the Zimbabwe regression. Forms *per se* have no effect on credit sales, unless they are used in combination with an information sharing network. All these results conform with expectations and speak strongly of the importance of information sharing as a screening mechanism.

Finally, we run equation (4) on a dummy that takes the value one if respondents ever offer credit to first time customers (Table 9). Data is available only for Zimbabwe and certain variables are dropped due to multicollinearity. Results confirm the paramount role that screening practices play in credit sales. They also confirm that firms that receive supplier credit are more likely to offer credit to their clients.

Conclusion

We have examined how African manufacturers gain access to supplier and bank credit, and how they grant credit to their customers. A proper understanding of these processes helps better assess not only barriers to enterprise development in Africa, but also how markets emerge. It is

well known that statistical discrimination and network effects can exclude certain groups of firms from credit markets and, more generally, from normal commercial practices. Using data from Kenya and Zimbabwe we provide preliminary evidence that network effects are present and deserve serious attention.

The two surveyed countries display high levels of ethnic and gender concentration in manufacturing. Black entrepreneurs and female-headed firms appear to have a harder time getting supplier credit, but ethnicity and gender plays no significant role in access to bank overdraft and formal loans. Variables measuring socialization and information sharing -- what we called network effects -- play a determinant role in access to trade and bank credit, and have an overwhelming effect on the granting of trade credit to clients. Although we cannot rule out the presence of discrimination, our results largely support the idea that network effects play an important role in explaining patterns of market interaction (e.g., Loury (1998)). Based on discussions with respondents, our interpretation is that black and female entrepreneurs are penalized by their lack of connections with the business establishment, and by the difficulties they face distinguishing themselves from the mass of small, inexperienced microenterprises headed by blacks or women. These factors lead to the partial or complete exclusion of many black and female firms from trade credit practices.

Lack of access to supplier credit is likely to hinder firm growth and to prevent them from joining the mainstream. Moreover, to the extent that delaying payment to suppliers is a major avenue through which firms absorb cash flow variations, firms that are denied supplier credit are probably more fragile and are expected to fail more frequently (e.g., Daniels (1994), Fafchamps et al. (1994), Fafchamps, Pender and Robinson (1995)). Exclusion may thus become a self-perpetuating process. The presence of these negative feedbacks could explain why small groups are able to dominate particular industries or activities.

Excluded firms are forced to resort to alternative and, generally, less efficient ways of con-

tracting with each other. Together, they create what could be labelled a 'flea market economy', that is, a secondary economy in which instantaneous transactions predominate and market institutions remain underdeveloped. Firms that operate in that market may invent ingenious, alternative ways of raising working capital -- like *susu* collectors and rotating savings and credit associations (ROSCAs) (e.g., Besley, Coate and Loury (1993), Aryeetey and Steel (1993)). But they remain cut from mainstream institutions and cannot gain the experience required to compete in the global market place. Because large segments of the entrepreneurial population are prevented from reaching their potential, growth and development remain stunted.

The close ties that existing firms have weaved among themselves are themselves an efficient response to asymmetric information and contract enforcement poblems. Networks constitute a valuable form of social capital (e.g., Fafchamps and Minten (1998a, 1998b)). Attempts by governments to alter the ethnic makeup of business through forceful removal of non-indigenous groups and other strong-hand approaches can result in a massive loss of network capital and result in a significant deterioration in the level of market sophistication. The conceptual approach proposed here suggests another way out of the quandary. Non-indigenous groups in Kenya and Zimbabwe appear to owe at least part of their success to their ability to identify each other. One way to assist indigenous business could thus be to ensure that credit reference information circulates widely, so as to minimize the role of old boys networks.[28] More research is needed on these important policy issues.

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[28] The experience of Zimbabwe suggests that such a move is, alone, insufficient to break the existing barriers that indigenous firms face. It may have to be combined with another approach adopted, for instance, by the Kenya Industrial Estates project. This approach consists in setting a small credit program that monitors repayment closely and keeps track of the credit history of its members. The information can then be disseminated and help reliable small businesses graduate into a larger firm pool and gain wider access to credit.

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Table 1. Composition of the Sample

Percentage of sample firms:	Nber of observ.	All	Kenya	Zimbabwe
		% of sample in the following categories:		
in Manufacturing	75	65%	62%	68%
in Trade	40	35%	38%	32%
in Food processing	26	23%	17%	29%
in Textile and garment	43	38%	38%	38%
in Wood products	22	19%	22%	16%
in Metal products	23	20%	22%	18%
with an ethnic African owner/manager	37	32%	42%	23%
with an ethnic Asian owner/manager	29	25%	46%	5%
with an ethnic European owner/manager	38	33%	5%	61%
with an owner/manager from other ethnicity	11	9%	7%	11%
in Kenya	58	50%	100%	0%
in Zimbabwe	57	50%	0%	100%
Total:	115			

Table 2. Descriptive Statistics

Firm characteristics		# valid obs.	All firms	Black (1)	Other (2)	Domin. (3)
Median number of employees		111	48	4	65	73
Median year that the firm was created		113	1975	1975	1970	1973
% of firms that are formally registered/incorporated		113	65%	41%	88%	73%
% of firms that are a subsidiary		113	14%	14%	6%	17%
% of firms headed by a woman		114	12%	30%	13%	2%
% of firms reporting severe cash-flow problems in recent past		103	35%	45%	38%	29%
Bank finance						
% of firms with overdraft		113	69%	40%	69%	85%
% of firms who ever got a loan from a financial institution		92	43%	27%	54%	50%
Credit from suppliers						
Median share of credit purchases in total purchases (in percent)		111	75	17	85	90
Median duration of supplier credit (in days)		110	30	10	30	30
Median cash discount on supplier credit (in percent)		57	3.75	2.5	3.75	3.25
Median implicit monthly interest rate (in percent)		53	2.5	5	3.75	2.5
% of firms that ever purchase on credit		113	85%	62%	94%	97%
% of firms who ever get offered credit from first purchase		92	68%	35%	60%	84%
Credit to clients						
Median share of credit sales in total sales (in percent)		81	50	0	33	75
% of firms that ever sell on credit		114	79%	57%	88%	90%
% of firms who ever offer credit from first purchase	(*)	54	63%	42%	50%	74%
Socialization						
% of firms that do not socialize with suppliers at all	(**)	109	46%	46%	7%	10%
% of firms that socialize with suppliers outside business	(**)	109	36%	11%	64%	44%
% of firms that do not socialize with clients at all	(*,**)	56	29%	38%	22%	26%
% of firms that socialize with clients outside business	(*,**)	56	21%	8%	44%	21%
% of firms that do not socialize with bank staff at all	(**)	102	41%	72%	20%	32%
% of firms that socialize with bank staff outside business	(**)	102	15%	3%	33%	16%
Screening of customers (multiple answeres allowed)						
% of firms that ask clients to fill forms		98	51%	30%	71%	56%
% of firms that rely on trial period to screen clients		98	56%	48%	64%	58%
% of firms that rely on reputation to screen clients		98	73%	59%	93%	75%
% of firms that rely on direct investigation to screen clients		98	37%	59%	50%	23%

Group (1) = owner/manager is an ethnic African. Group (2) = owner/manager is neither ethnic African nor member of the ethnic group that dominates business. Group (3) = owner/manager belongs to the ethnic group that dominates business in the country (Asians in Kenya, whites in Zimbabwe). (*) Data were collected in Zimbabwe only. (**) Other firms socialize during business hours.

Table 3. Tobit Regressions on the Share of Credit Purchases: Pooled Data
dependent variable is the share of credit purchases in total purchases from suppliers

	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	0.15	1.20	0.76	**4.16**	0.17	1.36	0.67	**3.42**
Zimbabwe dummy	0.13	1.11	0.36	**2.99**	0.04	0.41	0.25	**2.04**
Manufacturing dummy	-0.08	-0.81	-0.05	-0.53	0.00	0.01	-0.01	-0.06
Food sector dummy	-0.56	**-4.69**	-0.52	**-4.78**	-0.48	**-4.13**	-0.51	**-4.57**
Wood sector dummy	-0.36	**-3.07**	-0.41	**-3.70**	-0.27	**-2.26**	-0.37	**-3.11**
Metal sector dummy	-0.11	-0.93	-0.33	**-2.66**	-0.08	-0.70	-0.29	**-2.25**
Log(N.workers), instrumented	0.16	**3.32**	-0.03	-0.44	0.14	**3.02**	0.01	0.09
Registered business dummy	0.20	**1.68**	0.39	**3.01**	0.14	1.28	0.30	**2.35**
Subsidiary dummy	0.39	**2.36**	0.41	**2.70**	0.44	**2.80**	0.44	**2.94**
Past cash-flow probl. dummy	-0.23	**-2.52**	-0.15	**-1.81**	-0.21	**-2.50**	-0.16	**-2.03**
O/M is a woman			-0.36	**-2.26**			-0.30	**-1.92**
O/M is black			-0.35	**-3.43**			-0.29	**-2.63**
O/M does not socialize with suppliers					-0.18	-1.60	-0.08	-0.75
O/M socializes with suppliers outside business					0.16	**1.85**	0.07	0.84
Selection term	0.36		0.32		0.33		0.31	
Number of observations	97		97		93		93	
Log-likelihood	-51.74		-43.77		-43.66		-38.84	
Pseudo R-squared	0.41		0.50		0.48		0.54	

The reported estimates are Two-limit censored Tobit. Standard errors are not corrected for the presence of predicted variables in the regression.

Table 3a. Tobit Regressions on the Share of Credit Purchases: Kenya Only

dependent variable is the share of credit purchases in total purchases from suppliers

	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	
Intercept	0.17	1.06	0.85	**3.65**	0.17	1.22	0.59	**2.45**	
Manufacturing dummy	-0.20	-1.15	-0.12	-0.76	0.10	0.63	0.07	0.46	
Food sector dummy	-0.95	**-4.59**	-1.00	**-5.42**	-0.80	**-4.67**	-0.93	**-5.56**	
Wood sector dummy	-0.51	**-2.72**	-0.63	**-3.73**	-0.43	**-2.69**	-0.57	**-3.58**	
Metal sector dummy	-0.36	**-2.32**	-0.63	**-3.87**	-0.25	**-1.98**	-0.50	**-3.24**	
Log(N.workers), instrumented	0.22	**2.67**	-0.01	-0.06	0.17	**2.51**	0.07	0.84	
Registered business dummy	0.23	1.38	0.50	**2.96**	0.06	0.43	0.28	**1.79**	
Past cash-flow probl. dummy	-0.15	-0.98	-0.07	-0.52	-0.25	**-2.08**	-0.19	-1.64	
O/M is a woman			-0.60	**-2.91**			-0.47	**-2.69**	
O/M is black			-0.27	**-1.71**			-0.08	-0.51	
O/M does not socialize with suppliers					-0.23	**-1.82**	-0.19	-1.58	(*)
O/M socializes with suppliers outside business					0.33	**2.56**	0.21	1.61	(*)
Selection term	0.38		0.32		0.29		0.26		
Number of observations	50		50		47		47		
Log-likelihood	-28.10		-21.65		-16.83		-13.10		
Pseudo R-squared	0.40		0.54		0.62		0.71		

The reported estimates are Two-limit censored Tobit. Standard errors are not corrected for the
presence of predicted variables in the regression. (*): coefficients jointly significant:
F-test(2,36) that both socialization variables have null coefficient in last regression is 3.04 with p-value of 0.06.

Table 3b. Tobit Regressions on the Share of Credit Purchases: Zimbabwe Only

dependent variable is the share of credit purchases in total purchases from suppliers

	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	-0.07	-0.27	0.47	0.97	-0.08	-0.29	0.67	1.39
Manufacturing dummy	0.02	0.19	0.01	0.12	-0.03	-0.19	-0.05	-0.38
Food sector dummy	-0.19	-1.53	-0.15	-1.35	-0.17	-1.31	-0.15	-1.26
Wood sector dummy	-0.17	-1.28	-0.17	-1.40	-0.15	-1.08	-0.19	-1.45
Metal sector dummy	0.32	**1.84**	0.12	0.52	0.33	**1.89**	0.03	0.13
Log(N.workers), instrumented	0.20	**3.45**	0.09	0.81	0.21	**3.19**	0.06	0.53
Registered business dummy	-0.05	-0.34	0.05	0.26	-0.08	-0.54	0.07	0.35
Subsidiary dummy	0.34	**2.40**	0.35	**2.78**	0.29	**2.01**	0.30	**2.34**
Past cash-flow probl. dummy	-0.15	-1.52	-0.12	-1.32	-0.14	-1.27	-0.11	-1.11
O/M is a woman			-0.06	-0.23			-0.13	-0.53
O/M is black			-0.29	**-2.32**			-0.38	**-2.92**
O/M does not socialize with suppliers					0.21	1.10	0.34	**1.88**
O/M socializes with suppliers outside business					0.03	0.25	-0.01	-0.14
Selection term	0.28		0.26		0.28		0.24	
Number of observations	47		47		46		46	
Log-likelihood	-14.51		-11.89		-13.55		-9.44	
Pseudo R-squared	0.51		0.60		0.53		0.67	

The reported estimates are Two-limit censored Tobit. Standard errors are not corrected for the presence of predicted variables in the regression.

Table 4. Probit Regressions on Supplier Credit at First Purchase: Pooled Data

dependent variable is one if supplier credit is usually offered from first purchase, zero otherwise.

	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	-0.48	-0.95	1.02	1.32	-0.96	**-1.71**	0.58	0.66
Zimbabwe dummy	-0.77	**-1.89**	-0.40	-0.90	-0.79	**-1.82**	-0.47	-1.02
Manufacturing dummy	-0.39	-1.07	-0.39	-1.03	-0.43	-1.06	-0.50	-1.20
Food sector dummy	0.39	0.79	0.26	0.49	0.64	1.17	0.39	0.69
Wood sector dummy	-0.75	**-1.73**	-1.08	**-2.30**	-0.46	-0.95	-0.96	**-1.77**
Metal sector dummy	-0.06	-0.15	-0.57	-1.19	0.11	0.25	-0.49	-0.92
Log(N.workers), instrumented	0.45	**2.98**	0.16	0.84	0.45	**2.75**	0.18	0.92
Past cash-flow probl. dummy	-0.22	-0.62	-0.14	-0.39	-0.07	-0.18	-0.01	-0.02
O/M is a woman			-0.98	-1.49			-0.99	-1.47
O/M is black			-1.12	**-2.47**			-0.94	**-1.79**
O/M does not socialize with suppliers					0.19	0.36	0.53	0.91
O/M socializes with suppliers outside business					0.92	**2.38**	0.67	1.62
Number of observations	82		82		79		79	
Log-likelihood	-43.34		-38.60		-38.36		-35.38	
Pseudo R-squared	0.17		0.26		0.23		0.29	

Standard errors are not corrected for the presence of predicted variables in the regression.

Table 4a. Probit Regressions on Supplier Credit at First Purchase: Kenya Only

dependent variable is one if supplier credit is usually offered from first purchase, zero otherwise.

	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	-0.28	-0.41	1.43	1.28	-0.61	-0.79	1.29	0.91
Manufacturing dummy	-1.35	-1.60	-1.04	-1.11	-1.02	-0.99	-0.97	-0.90
Food sector dummy	0.48	0.62	0.00	0.00	0.27	0.31	-0.29	-0.30
Wood sector dummy	-0.06	-0.11	-0.50	-0.79	0.14	0.24	-0.48	-0.64
Metal sector dummy	0.58	1.42	0.05	0.11	0.72	1.58	0.21	0.37
Log(N.workers), instrumented	-0.43	-0.56	-0.11	-0.13	-0.89	-1.03	-0.31	-0.30
Past cash-flow probl. dummy	0.23	0.39	0.36	0.58	-0.08	-0.12	0.11	0.15
O/M is a woman			-0.39	-0.38			-0.35	-0.34
O/M is black			-1.39	**-1.77**			-1.35	-1.46
O/M does not socialize with suppliers					-0.36	-0.44	-0.44	-0.52
O/M socializes with suppliers outside business					0.54	0.93	-0.12	-0.16
Number of observations	38		38		36		36	
Log-likelihood	-22.59		-20.23		-19.87		-18.38	
Pseudo R-squared	0.07		0.17		0.13		0.20	

Standard errors are not corrected for the presence of predicted variables in the regression.

Table 4b. Probit Regressions on Supplier Credit at First Purchase: Zimbabwe Only

dependent variable is one if supplier credit is usually offered from first purchase, zero otherwise.

	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	-4.03	**-2.54**	-1.26	-0.58	-5.38	**-2.43**	-3.10	-1.11
Manufacturing dummy	0.47	0.82	0.46	0.77	0.13	**0.19**	0.04	0.05
Food sector dummy	1.06	1.36	1.32	1.45	1.66	**1.68**	1.49	1.58
Wood sector dummy	0.06	0.09	-0.22	-0.33	0.71	0.82	0.34	0.38
Metal sector dummy	0.99	1.34	0.35	0.40	1.21	1.40	0.80	0.74
Log(N.workers), instrumented	0.81	**3.02**	0.34	0.92	0.90	**2.57**	0.54	1.23
Past cash-flow probl. dummy	-0.28	-0.55	-0.31	-0.57	0.18	0.29	0.05	0.08
O/M is a woman			(*)				(*)	
O/M is black			-1.20	-1.51			-0.62	-0.65
O/M does not socialize with suppliers					0.93	0.93	1.21	1.03
O/M socializes with suppliers outside business					1.79	**2.29**	1.63	**1.89**
Number of observations	44		40		43		39	
Log-likelihood	-18.30		-16.27		-14.73		-13.41	
Pseudo R-squared	0.34		0.28		0.46		0.40	

Standard errors are not corrected for the presence of predicted variables in the regression. (*) Gender predicts outcome perfectly; consequently, gender variable and 4 observations were dropped from the regression.

Table 5. Tobit Regressions on Payment Terms Made by Suppliers: Pooled Data

dependent variable is the log of the number of days +1 that separate delivery and payment; it is equal to 0 fc
firms that do not receive supplier credit.

	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	0.57	1.29	1.46	**2.20**	0.83	**1.79**	1.53	**2.11**
Zimbabwe dummy	0.09	0.24	0.38	0.86	-0.12	-0.32	0.13	0.28
Manufacturing dummy	-0.12	-0.36	-0.04	-0.11	0.12	0.35	0.13	0.39
Food sector dummy	-1.04	**-2.68**	-0.99	**-2.57**	-1.02	**-2.61**	-1.05	**-2.70**
Wood sector dummy	0.09	0.24	0.00	0.00	0.03	0.08	-0.12	-0.29
Metal sector dummy	0.59	1.45	0.25	0.54	0.58	1.51	0.30	0.64
Log(N.workers), instrumented	0.61	**3.54**	0.36	1.51	0.61	**3.48**	0.43	**1.82**
Registered business dummy	0.26	0.63	0.44	0.94	0.13	0.31	0.27	0.57
Subsidiary dummy	-0.29	-0.66	-0.11	-0.23	-0.13	-0.30	-0.03	-0.06
Past cash-flow probl. dummy	-0.52	**-1.76**	-0.38	-1.26	-0.58	**-2.01**	-0.49	**-1.67**
O/M is a woman			-0.38	-0.62			-0.32	-0.52
O/M is black			-0.69	**-1.81**			-0.53	-1.28
O/M does not socialize with suppliers					-0.78	**-1.99**	-0.62	-1.52
O/M socializes with suppliers outside business					0.02	0.06	-0.12	-0.37
Selection term	1.30		1.28		1.24		1.23	
Number of observations	97		97		93		93	
Log-likelihood	-154.2		-152.4		-143.7		-142.8	
Pseudo R-squared	0.13		0.14		0.15		0.15	

Standard errors are not corrected for the presence of predicted variables in the regression.

Table 5a. Tobit Regressions on Payment Terms Made by Suppliers: Kenya Only

dependent variable is the log of the number of days +1 that separate delivery and payment; it is equal to 0 fc firms that do not receive supplier credit.

	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	0.30	0.39	1.10	1.01	1.14	1.45	1.53	1.16
Manufacturing dummy	-0.58	-0.70	-0.46	-0.55	-0.02	-0.03	-0.13	-0.15
Food sector dummy	-1.92	**-2.36**	-1.90	**-2.30**	-1.70	**-2.09**	-1.83	**-2.13**
Wood sector dummy	0.26	0.35	0.13	0.18	0.31	0.41	0.19	0.24
Metal sector dummy	0.30	0.44	0.05	0.07	0.27	0.41	0.05	0.06
Log(N.workers), instrumented	0.72	**1.87**	0.47	1.04	0.57	1.48	0.49	1.10
Registered business dummy	0.77	1.07	0.96	1.24	0.73	1.00	0.90	1.12
Past cash-flow probl. dummy	-0.39	-0.64	-0.22	-0.34	-0.57	-0.99	-0.48	-0.75
O/M is a woman			-0.44	-0.42			-0.50	-0.47
O/M is black			-0.61	-0.83			-0.14	-0.16
O/M does not socialize with suppliers					-1.68	**-2.63**	-1.64	**-2.38**
O/M socializes with suppliers outside business					-0.42	-0.65	-0.59	-0.77
Selection term	1.68		1.66		1.54		1.54	
Number of observations	49		49		46		46	
Log-likelihood	-81.29		-80.80		-72.21		-72.08	
Pseudo R-squared	0.12		0.12		0.17		0.17	

Standard errors are not corrected for the presence of predicted variables in the regression.

Table 5b. Tobit Regressions on Payment Terms Made by Suppliers: Zimbabwe Only

dependent variable is the log of the number of days +1 that separate delivery and payment; it is equal to 0 fc
firms that do not receive supplier credit.

	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	0.89	1.35	2.26	**1.84**	0.74	1.16	2.42	**2.07**
Manufacturing dummy	-0.28	-0.92	-0.18	-0.61	-0.49	-1.58	-0.42	-1.38
Food sector dummy	-0.34	-1.09	-0.32	-1.04	-0.45	-1.47	-0.43	-1.47
Wood sector dummy	-0.06	-0.19	-0.16	-0.46	-0.12	-0.36	-0.27	-0.81
Metal sector dummy	1.25	**3.00**	0.68	1.16	1.23	**3.10**	0.54	0.98
Log(N.workers), instrumented	0.69	**4.53**	0.38	1.31	0.76	**4.95**	0.41	1.49
Registered business dummy	-0.84	**-2.07**	-0.45	-0.82	-0.95	**-2.42**	-0.53	-1.03
Subsidiary dummy	-0.27	-0.87	-0.17	-0.54	-0.55	**-1.75**	-0.45	-1.46
Past cash-flow probl. dummy	-0.28	-1.09	-0.25	-1.00	-0.31	-1.22	-0.28	-1.16
O/M is a woman			-0.55	-0.81			-0.58	-0.91
O/M is black			-0.51	-1.50			-0.72	**-2.15**
O/M does not socialize with suppliers					0.96	**2.27**	1.15	**2.77**
O/M socializes with suppliers outside business					0.19	0.72	0.11	0.42
Selection term	0.78		0.76		0.74		0.70	
Number of observations	48		48		47		47	
Log-likelihood	-57.24		-56.05		-53.66		-51.40	
Pseudo R-squared	0.67		0.68		0.69		0.70	

Standard errors are not corrected for the presence of predicted variables in the regression.

Table 6. Heckman Regression on Implicit Interest Rate for Supplier Credit

dependent variable is the log of the implicit monthly interest rate +1, computed as cash discount x 30 divided by the delay between delivery and payment; one-step estimator using Mills ratio correction.

	Coef.	t-stat.	Coef.	t-stat.
Intercept	1.59	**3.04**	1.65	**3.18**
Zimbabwe dummy	0.76	**2.12**	0.80	**2.08**
Log(N.workers), instrumented	-0.14	-1.07	-0.16	-1.13
Past cash-flow probl. dummy	0.04	0.18	0.05	0.18
O/M is a woman	0.81	**1.84**	0.81	**1.81**
O/M is black	-0.23	-0.67	-0.28	-0.82
O/M does not socialize with suppliers			0.10	0.27
O/M socializes with suppliers outside business			-0.02	-0.09
Selection equation:				
Intercept	-0.32	-0.14	-0.32	-0.17
Zimbabwe dummy	-0.04	-0.03	-0.04	-0.03
Manufacturing dummy	-2.88	-1.48	-2.88	-1.58
Food sector dummy	-3.42	**-2.30**	-3.42	**-2.43**
Wood sector dummy	-1.72	-1.23	-1.72	-1.36
Metal sector dummy	-0.82	-0.41	-0.82	-0.61
Log(N.workers), instrumented	1.47	**1.80**	1.47	**1.86**
Registered business dummy	0.91	0.86	0.91	0.91
Past cash-flow probl. dummy	-0.21	-0.19	-0.21	-0.19
O/M is a woman	-1.90	-1.24	-1.90	-1.31
O/M is black	0.45	0.33	0.45	0.40
O/M does not socialize with suppliers	-1.03	-1.06	-1.03	-1.24
O/M socializes with suppliers outside business	-0.60	-0.37	-0.60	-0.37
Correlation between errors	-0.36		-0.42	
Number of observations	59		59	
Log-likelihood	-56.04		-56.59	

Standard errors are not corrected for the presence of predicted variables in the regression.

Table 7. Probit Regressions on Overdraft Facility and Bank Loan: Pooled Data

dependent variable is one if the firm has a bank overdraft facility (first regression) or one if the firm has ever received a bank loan (second regression)

	Overdraft				Bank loan			
	Coef.	*t-stat.*	*Coef.*	*t-stat.*	*Coef.*	*t-stat.*	*Coef.*	*t-stat.*
Intercept	-2.01	**-2.41**	-0.97	-0.74	-0.91	-1.03	0.76	0.62
Zimbabwe dummy	-0.70	-1.27	-1.37	**-1.77**	-1.16	**-2.04**	-0.99	-1.59
Manufacturing dummy	-0.52	-1.23	0.06	0.11	0.32	0.83	0.75	1.63
Food sector dummy	0.14	0.30	0.29	0.48	0.55	1.21	0.62	1.26
Wood sector dummy	0.07	0.16	-0.12	-0.19	0.35	0.74	0.12	0.24
Metal sector dummy	1.65	**2.70**	1.82	**2.30**	-0.45	-0.71	-1.16	-1.45
Log(N.workers), instrumented	0.99	**3.14**	1.27	**2.71**	0.19	0.64	-0.14	-0.38
Registered business dummy	-0.63	-1.16	-1.49	**-1.99**	0.85	1.45	0.88	1.32
Subsidiary dummy	-1.60	**-2.78**	-1.85	**-2.67**	-0.86	**-1.71**	-0.67	-1.31
Past cash-flow probl. dummy	-0.41	-1.12	-0.67	-1.42	-0.05	-0.15	-0.09	-0.23
O/M is a woman	0.49	0.72	0.60	0.62	0.41	0.56	-0.17	-0.20
O/M is black	0.03	0.07	0.37	0.69	-0.10	-0.21	0.06	0.11
O/M does not socialize with bank staff			-1.88	**-2.98**			-1.00	**-1.95**
O/M socializes with bank staff outside business			-2.39	**-3.09**			-0.34	-0.63
Number of observations	100		91		79		73	
Log-likelihood	-42.65		-28.06		-42.22		-37.63	
Pseudo R-squared	0.31		0.47		0.22		0.26	

Standard errors are not corrected for the presence of predicted variables in the regression.

Table 8. Tobit Regressions on the Share of Credit Sales: Pooled Data
dependent variable is the share of credit sales in total sales to clients

	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	-0.02	-0.09	-0.76	**-3.60**	-0.43	-1.43	-0.36	-1.28
Zimbabwe dummy	0.18	1.36	0.15	1.31	0.19	1.53	0.11	1.10
Manufacturing dummy	0.27	**2.74**	0.49	**4.79**	0.45	**4.40**	0.33	**4.04**
Food sector dummy	-0.54	**-4.41**	-0.30	**-1.93**	-0.41	**-2.43**	-0.46	**-3.21**
Wood sector dummy	-0.14	-1.13	-0.14	-1.00	-0.23	-1.49	-0.15	-1.21
Metal sector dummy	-0.18	-1.29	-0.20	-1.50	-0.22	-1.64	-0.17	-1.49
Log(N.workers), instrumented	0.12	**2.23**	0.00	0.05	0.04	0.58	0.03	0.55
O/M is a woman	-0.10	-0.50			0.01	0.05	0.06	0.37
O/M is black	-0.30	**-2.65**			-0.24	**-1.74**	-0.11	-1.01
Share of credit purchases, instrumented			0.91	**3.29**	0.56	1.64	0.26	0.92
Prob. overdraft, instrumented			0.41	**2.12**	0.24	1.14	0.36	**2.08**
Past cash-flow probl. dummy			-0.07	-0.62	-0.10	-0.93	-0.13	-1.54
Client screening using forms							-0.05	-0.45
Client screening using reputation							0.39	**3.25**
Client screening using trial period							0.02	0.31
Client screening using pers. investigation							-0.19	**-2.35**
Selection term	0.37		0.32		0.31		0.23	
Number of observations	79		68		68		59	
Log-likelihood	-41.58		-27.88		-26.32		-6.83	
Pseudo R-squared	0.41		0.53		0.56		0.84	

The reported estimates are Two-limit censored Tobit. Standard errors are not corrected for
the presence of predicted variables in the regression.

Table 8b. Tobit Regressions on the Share of Credit Sales: Zimbabwe Only

dependent variable is the share of credit sales in total sales to clients

	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	-0.23	-0.69	-0.79	**-2.67**	-0.53	-1.16	0.15	0.44
Manufacturing dummy	0.36	**3.80**	0.56	**4.90**	0.50	**4.23**	0.23	**3.01**
Food sector dummy	-0.51	**-4.50**	-0.52	**-3.97**	-0.55	**-4.17**	-0.43	**-4.50**
Wood sector dummy	-0.10	-0.81	-0.12	-0.80	-0.16	-1.06	-0.17	-1.69
Metal sector dummy	-0.04	-0.32	-0.18	-1.08	-0.12	-0.69	-0.00	-0.01
Log(N.workers), instrumented	0.17	**2.87**	0.10	1.29	0.16	**1.76**	0.11	**1.90**
O/M is a woman	0.12	0.59			0.13	0.64	0.01	0.05
O/M is black	-0.21	**-1.86**			-0.20	-1.25	-0.20	**-2.07**
Share of credit purchases, instrumented			0.64	**1.76**	0.28	0.65	0.07	0.23
Prob. overdraft, instrumented			0.29	1.11	0.14	0.49	-0.03	-0.17
Past cash-flow probl. dummy			-0.07	-0.64	-0.12	-1.07	-0.10	-1.45
O/M does not socialize with clients							-0.18	**-2.29**
Client screening using forms							-0.16	-1.33
Client screening using reputation							0.36	**2.74**
Client screening using trial period							-0.11	**-1.85**
Client screening using pers. investigation							-0.40	**-4.82**
Selection term	0.29		0.28		0.27		0.15	
Number of observations	51		45		45		40	
Log-likelihood	-14.16		-11.77		-10.59		12.47	
Pseudo R-squared	0.58		0.63		0.67		1.62	

The reported estimates are Two-limit censored Tobit. Standard errors are not corrected for
the presence of predicted variables in the regression.

Table 9. Probit Regressions on Trade Credit at First Sale: Zimbabwe Only

dependent variable is one if respondent usually offers trade credit to first time clients, zero otherwise.

	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
Intercept	-0.67	-0.45	-1.84	-1.41	-4.00	-1.50	-3.26	-0.48
Manufacturing dummy	0.12	0.27	0.74	1.27	0.94	1.40	6.60	1.61
Food sector dummy	0.15	0.29	1.20	**1.75**	1.30	**1.78**	10.52	**1.75**
Wood sector dummy	0.03	0.05	1.34	1.53	1.71	**1.75**	-0.41	-0.21
Metal sector dummy	0.30	0.47	-0.64	-0.79	-0.59	-0.68	-7.57	-1.47
Log(N.workers), instrumented	0.19	0.73	-0.41	-1.05	-0.34	-0.79	-2.62	-1.49
O/M is a woman	0.63	0.75			1.41	1.28	(*)	
O/M is black	-0.60	-1.19			0.48	0.48	-2.92	-0.96
Share of credit purchases, instrumented			4.54	**1.92**	5.42	**1.80**	41.95	**1.66**
Prob. overdraft, instrumented			-0.46	-0.33	0.31	0.19	7.44	1.08
Past cash-flow probl. dummy			0.06	0.13	0.09	0.17	(*)	
O/M does not socialize with clients							17.38	**1.74**
Client screening using forms							-25.54	**-1.67**
Client screening using trial period							-10.50	**-1.96**
Client screening using pers. investigation							-4.69	**-2.04**
Number of observations	52		45		45		43	
Log-likelihood	-32.05		-23.75		-22.83		-7.83	
Pseudo R-squared	0.06		0.17		0.20		0.71	

The reported estimates are standard Probit. Standard errors are not corrected for the presence of predicted variables in the regression. (*) Variables had to be dropped due to insufficient variation in the data.

Table A. Prediction Equation for Firm Size

dependent variable = log(number of employees + 1)

	Kenya		Zimbabwe	
	Coef.	*t-ratio*	Coef.	*t-ratio*
Intercept	-4381.7	**-2.27**	-1468.5	-1.02
Manufacturing dummy	0.96	**2.95**	0.48	0.96
Food sector dummy	0.06	0.12	0.14	0.27
Wood sector dummy	-0.40	-0.91	0.09	0.14
Metal sector dummy	-0.20	-0.47	-1.50	**-2.55**
Year firm was created	4.50	**2.28**	1.53	1.03
Year squared	-11.55	**-2.30**	-3.98	-1.05
Registered business dummy	0.95	**2.69**	1.02	**1.92**
O/M is a woman	-0.96	**-1.73**	-1.55	**-1.99**
O/M is black	-1.07	**-1.73**	-0.63	-0.96
O/M belongs to dominant bus. group	-0.56	-1.06	0.07	0.12
Number of observations	55		55	
R-squared	0.64		0.47	