DETERMINANTS OF SMALL-SCALE BUSINESS OWNERS’ PARTICIPATION IN FORMAL MICROCREDIT MARKETS IN SUDAN

Abbas Magboul
University of Pretoria, South Africa
Rashid Hassan
University of Pretoria, South Africa

ABSTRACT

Heckman two-step selection model was used to analyze influences of household, business, and lender-related factors on the decision to participate and level of participation in formal microcredit using data from a survey of Micro and Small Enterprises (MSEs) in Sudan. Results suggest measures to strengthen business skills of MSEs managed by women, lower income owners, and relatively disadvantaged migrants, through increased awareness, training and other complementary mechanisms to increase their participation and demand for microcredit. Innovative measures to ease constraining lender-related factors such as collateral requirements and loan processing time need to consider lending to beneficiary groups (e.g. cooperatives) to reduce risks of repayment defaults. It is clear that the Murabaha mode of finance needs to be reformed and alternative lower risk options be provided as well as balancing the current unequal distribution of bank branches to improve access and reduce costs to potential clients in currently lacking areas.

JEL Classification: C01, C08, G2, O2

Key words: Micro and Small enterprises, Heckman selection model, microcredit

Corresponding Author’s E-mail Address: abastalodi@hotmail.com

INTRODUCTION

Demand for microfinance by Micro and Small Enterprises (MSEs) in Sudan, has substantially increased over the past few years as a result of significant expansion of the sector, particularly in Khartoum State due to several factors (UNICONS, 2006). Firstly, demand for the products and services of the MSEs sector has seen tremendous growth in recent years inducing the observed expansion. Goods and services supplied by the MSEs sector are more accessible and often cheaper for a needing bulk of the population. It is estimated that MSEs provide 70 percent of the basic household needs for the majority of the population in Sudan (Awad in UNICONS, 2006). The growing demand for products of the small-scale business sector is attributed to the high influx of migrants from other regions driven out by armed conflicts and/or natural disasters. Secondly, the high cost of living has led large numbers of poor and low income people to engage in self-employment activities in order to supplement their income. Thirdly, market liberalization and privatization policies introduced since the 1990s reduced employment opportunities in the public sector, and thus a large number of people, both male and female, were forced to seek self-employment activities (UNICONS, 2006).

One policy response option was to introduce microfinance in the banking system of Sudan to encourage self-employment, create job opportunities and increase per capita income among the economically active poor. To this effect, the Central Bank of Sudan (CBS) introduced a new credit policy in 1994, which directed banks to allocate 5% of their portfolio to microfinance (CBS, 1994). Nevertheless, microfinance
lending (microcredit) up to the end of 2011 did not exceed 1.7 per cent of the total volume of the portfolio of most banks (Abukasawi, 2011). For more integration of microfinance into commercial banks, the CBS launched a Microfinance Strategy in the early 2007 directing all commercial banks to allocate a minimum of 12% of their portfolio to microfinance lending (CBOS Policy, 2007). This policy was expected to result in more efficient financial intermediation and improve access to loanable funds for MSEs. Nevertheless, microcredit provision until June 2014 did not exceed 5% of the total lending portfolio of most banks (Abukasawi & Widad, 2014). Some other nongovernmental organizations, social programs, and governmental social funds are also currently undertaking microfinance operations in the country, but their outreach remains weak.

Due to the weak performance of microfinance, the CBS has commissioned some local and international organizations to study the causes. A survey of MSEs in Khartoum state indicated that 93% of the respondents, despite their need for credit never received loans from either formal or semi-formal institutions (PlaNet Finance, 2007). Another study that covered four states showed that 91% of the respondents expressed need for credit, but due to lengthy and slow disbursement procedures they had to resort to informal sources. At the macro level, the study showed the domination of government in the industry (UNICONS, 2006). At the micro level, this same study showed that banks are reluctant to do business with the poor. Although some microfinance specialized banks, namely the Family Bank (FB) and the Savings and Social Development Bank (SSDB), are active in mobilizing savings they have not been attractive to clients because of the Islamic law that prohibits interest payment on deposits (PlaNet Finance, 2007; UNICONS, 2006).

The main conclusion of these studies is that there is a large gap between the supply of and demand for microcredit in many regions in Sudan. This is considered a major constraint to MSEs which constitute a majority of village-based farmers and nomadic pastoralists. Most of the MSEs surveyed described microcredit offered by banks as inadequate and unaffordable, and as a result most of the microcredit services take place within the informal economy (UNDP, 2010; PlaNet Finance, 2007; UNICONS, 2006).

Although these studies have provided useful information about the industry, important issues for policy making have not been addressed. On the demand side, the said studies have not analyzed individual-related, business-related and institution-related factors that influence the decision to participate and intensity of participation in formal microcredit. The present study made an attempt to analyze influences of above-mentioned factors on both the decision to participate and intensity of participation of MSEs owners in formal microcredit in Sudan through Murabaha Islamic Contract (MIC) by adopting existing analytical approaches and empirical models of relevance. The purpose is to distill lessons and arrive at conclusions that are expected to improve Sudan’s microfinance policies and strategies for development and poverty reduction.

The Khartoum state has been chosen as the case study area as it is currently the focal area and center of microcredit activities. There are 33 banks currently operating 517 branches countrywide and more than 50 percent of these branches are based in Khartoum state. This concentration is due to the infrastructure deemed appropriate by banks for such services in addition to the fact that Khartoum is the capital city where commercial, industrial and financial institutions and activities are found. The study focused on the MIC, also known as purchase and resale plus markup, because it is the most commonly used mode of finance in all commercial banks in Sudan and constitutes 97 percent of banks’ total microcredit lending (Abukasawi, 2011).

The following section of the paper presents the analytical framework and empirical approaches. Section 3 discusses the case study area and sources and methods of data collection. Section 4 develops the
empirical model and defines variables used in the analyses. Section 5 presents results of the empirical estimation and Section 6 concludes providing some policy implications and recommendations.

THE ANALYTICAL FRAMEWORK AND EMPIRICAL APPROACHES

As the main objective of this study is to investigate determinants of MESs owners’ decision to participate and intensity of participation in formal microcredit in Sudan, it is demand focused. Some studies investigated demand for microcredit based on behavioural assumptions from theory of the consumer for households who use microcredit for consumption or investment (Mpuga, 2004; Fabbri & Padula, 2002; Magri, 2002). This study will not cover consumers’ demand, as microcredit in Sudan mainly targets small-scale enterprises in production, trade and services sectors.

Demand for microcredit in our case therefore represents participation of MSEs. These firms, however, often spend some of the received loans on non-production uses, such as paying school fees, medical and other expenses. Also, usually no records are kept or revealed on how these firms allocate the received credit among the various production inputs and activities to allow estimation of input demand functions based on theory of the firm behavioral assumptions. Our study of demand for microcredit by MSEs will therefore be based on pragmatic analytical frameworks and approaches commonly employed in the literature as discussed below.

The most commonly used models in the analysis of credit participation research are choice models. Various versions of choice models have been employed depending on the nature of the dependent variable under study (binary and multinomial Probit or logit models, etc.). When the response variable is measured as a continuous quantity (amount borrowed), versions of truncated distribution models such as Tobit are common (Vaessen, 2000; Mpuga, 2004; Shah et al., 2008; Doan et al., 2010; Duman, 2009; Li, 2010; Nguyen, 2007; Dutta and Magableh, 2006; Aga and Reilly, 2011; Messah and Wangi, 2011; Muhongoyire et al., 2013; Sekyi et al., 2014; Okten & Osili, 2004).

Demand decisions considered in this study include the following:

- The decision to apply for a loan or not (participation).
- The amount of credit to apply for (intensity of participation).

This sequence of decisions have been modeled and analyzed in many ways in the literature. This study will adopt combinations of such models. The two-step Heckman’s selection model (1976) used by many researchers of demand for microcredit (Okurut et al., 2005; Nguyen, 2007; Dutta and Magableh, 2006; Agier and Szafarz, 2011; Quoc et al., 2012; Daniel et al., 2013; Aga and Reilly, 2011) will be adopted to analyze determinants of decision questions 1 and 2 (i.e. the choice to participate and intensity of participation). A Probit model is typically employed for the first stage estimation of the probability to apply for a loan or not (decision 1) and a Tobit model then estimates the intensity question of how much applied for in stage two.

In a two-stage process, stage one selects who participates and who doesn’t and hence included in the second stage is a sub-sample of the first. Thus, it is likely that in the second stage the sub-sample of only those who have applied for microcredit is non-random and necessarily different from the first stage (which includes those who did not apply as well). This creates a sample selection bias, which requires use of the two-step maximum likelihood procedure of Heckman (1976) to correct for this selection bias. Heckman’s sample selection model assumes that there exists an underlying relationship of the following form:

\[ y_j^* = x_j \beta + \mu_j \]
Where \( y^*_j \) is the latent choice variable (participate or not), \( X \) is a vector of explanatory variables hypothesized to affect participation, \( \beta \) is the vector of model parameters to be estimated and \( \mu_j \) is the independently distributed error term with mean zero and variance \( \sigma^2 \). The first stage estimation of the Heckman two-step Probit procedure involves only the binary observed outcome of (participate or not) specified as:

\[
y = x\delta + \varepsilon \text{ if } y^*_j > 0
\]

\[
y = 0 \text{ otherwise (i.e. } y^*_j \leq 0)\]

Equation (2) represents a Probit model specification when the outcome is limited to the zero/one range, i.e. applied (\( y^*_j = 1 \)) or not (\( y^*_j = 0 \)).

The dependent variable \( y^*_j \) is observed only if event \( j \) is observed, \( \delta \) is the vector of parameters to be estimated and \( \varepsilon \) is the residual error term. After deciding to participate (apply for credit) borrowers then choose how much credit they need (size of the loan). In such case the binary variable of model 2 defines a response variable with a distribution truncated from below at zero value for those who did not apply (e.g. \( y^*_j = 0 \)). On the other hand, the response variable assumes a continuous value greater than zero for those who applied for credit (\( y^*_j > 0 \)). The probability that the outcome of stage two will be zero in the Tobit model can be specified as (Green, 2000):

\[
P(y_j = 0) = \phi\left( \frac{-\beta'x_i}{\sigma} \right)
\]

And the density function for the positive values of \( y_i \) is given by:

\[
f(y_i / y_i > 0) = \frac{f(y_i)}{P(y_i > 0)} = \frac{1}{\phi\left( \frac{\beta'x_i}{\sigma} \right)} \frac{\phi(y_i - \beta'x_i)}{\sigma}
\]

Applying OLS to estimate parameters of this model will exclude the zero values and hence yields inefficient estimators. Maximum likelihood estimation of a Tobit model specification is therefore considered more appropriate for the second stage estimation of determinants of intensity of participation (i.e. how much credit applied for).

When the error terms from the selection and the outcome equations (first and second stages) are correlated, standard Probit techniques applied to equation (2) could yield inefficient estimation results. Thus, the Heckman two-step procedure, e.g. Probit in stage 1 (model 2) and Tobit in stage 2 (model 3) provides consistent and asymptotically efficient estimates for all parameters in such models (Van de Ven & Van Praag 1981).

THE CASE STUDY AREA AND SOURCES AND METHODS OF DATA COLLECTION

The current study is based on data collected from a cross-section survey of MSEs operators in Khartoum State, Sudan during the period from June to July 2013. The state is one of 17 states of Sudan. It lies between latitude 15-16N and longitude 21-24E with a total area of 22,122 km\(^2\) and a population size estimated at 5,274,321 (Sudan Central Bureau of Statistics, 2008/09). The survey covered a total of 690 MSEs to compile the data needed for studying demand for microcredit in the three areas of Khartoum state (Khartoum, Omdurman and
Khartoum North). Stratified multi-stage sampling was employed to select the surveyed sample. Three variables, namely administrative division, mode of living (rural/urban) and business size (small/micro) were used to stratify the MSEs population in the state leading to 12 strata.

Each of these three areas of the state is made up of administrative units (AUs) with clearly defined administrative borders which allow for no overlap and these formed our primary sampling units (PSUs). Each of these AUs was further divided into clearly specified non-overlapping residential areas (towns in urban and villages in rural domains) which were taken as second stage sampling units (SSUs). Finally, those residential areas containing MSEs were further stratified into small and micro enterprises to represent ultimate sampling units (USUs). A three-stage sampling was performed in each of the twelve strata thereby leading to an overall sample which is efficient both in terms of being representative and less costly (See appendix table 1).

The main objective of the survey was to collect and analyze information on the characteristics and operations of MSEs in Khartoum state. The collected data accordingly contains detailed information on various aspects of MSEs, such as geographic, demographic and socioeconomic attributes of the MSEs owners (i.e. gender, age, education, etc.), characteristics of the firm (age of business, location, formality, size, etc.) and lender-related attributes such as collateral requirement. The data was collected using structured questionnaires administered through direct interviews with the selected respondents.

The surveyed population in the study area was found to be male dominated (81%) with the majority from the economically active age group of between 25 and 40 years (57%) followed by those between 40 and 60 (28%). The surveyed population is predominantly Muslims (98.2%), with an average family size of four persons. About two thirds (65%) of the respondents are married while unmarried singles form the bulk (30%) of the rest. Education levels among MSEs owners in the study area appear high as above 80% of them received some education dominated by those who completed secondary school education (40%) followed by university graduates (28%).

Less than one third of those operating MSEs in Khartoum State came from within the state (27%) or from neighboring states (Central 26% and Northern 13%) while about a quarter came from states to the western borders of the country (Kordofan 16% and Darfur 11%). Most of those from Khartoum and other neighboring states seem to reside in the Khartoum area (more than 60% of those from within and the bulk of those from Central, Northern and Eastern States) whereas the majority of those from western regions (more than half of those originating in Kordofan and Darfur) seem to settle in Omdurman area with Khartoum North showing relatively equal shares from all origins.

Trade (mainly retailing activities of purchasing goods in order to resell them for profit, e.g. street vendors, small grocery shops, etc.) appears to be the dominant activity of MSEs in both urban and rural areas (73% and 71%, respectively) and more MSEs are involved in production activities (activities involving transforming raw materials into goods in order to sell them for profit, e.g. carpentry, handicrafts, shoemaking, etc.) in rural (29%) compared to urban areas (8%) whereas none of them are engaged in services (e.g. small restaurants and food and tea vending, small local transport, small mechanical and other repairs and maintenance workshops, barber, tailor, etc.) in rural areas.

All respondents from rural areas applied for microcredit only once while those from urban areas who applied once form (98%). About half of those from within Khartoum applied once (44%) while those from
neighboring states (Central 19%, Northern 8% and Eastern 4%) and states to the west (Kordofan 14% and Darfur 10%) showing relatively equal shares.

THE EMPIRICAL MODEL AND VARIABLES USED IN THE ANALYSES

The above described two-step Heckman selection analytical framework is implemented in the empirical analyses as specified below:

\[ P_i = \delta Z_i + \epsilon_i \quad E(\epsilon_i / z) = 0 \] (5)

This defines the Probit model for the step 1 Heckman selection estimation of determinants of participation (i.e. determinants of the probability of business owners’ participation in formal microcredit).

Where \( P_i \) is the choice (selection) dummy for participation in formal microcredit (i.e. apply for loan), \( Z_i \) is a vector of variables that influence the participation decision, \( \delta \) estimates model parameters, and \( \epsilon_i \) is the error term.

In step 2 we estimate the outcome equation explaining intensity of participation:

\[ Y_i = \beta X_i + \mu_i \quad E(\mu_i / X) = 0 \] (6)

Where \( Y_i \) indicates intensity of participation measured by the amount of credit applied for, \( X_i \) is a vector of explanatory variables, \( \beta \) is the vector of parameter estimates and \( \mu_i \) is the error term. The model assumes that \( Z \) and \( X \) are observable exogenous variables and \( X \) is a subset of \( Z \). If the correlation between \( \epsilon_i \) and \( \mu_i \) is not zero, it brings about the selection bias problem. After estimating the selection equation a non-selection bias is computed using equation (7) below:

\[ E(\epsilon_i / P_i, Z_i) \] (7)

This is the Inverse Mills Ratio (IMR) \( \lambda(\delta Z_i) \) when \( P_i = 1 \). The new \( \lambda \) is used in the selection equation (6) as an explanatory variable. The model for the second stage regression then becomes (Green, 2000):

\[ E(Y_i = Z_i, P_i = 1) = \beta X_i \rho \lambda(\delta Z_i) \] (8)

Equation (8) estimates the expected amount of credit \( Y_i \) given the vectors of observable factors \( Z_i \) and given that the MSE owner has already made the decision to participate in formal microcredit. This can be explained by a vector of the observable characteristics \( X_i \) and the IMR evaluated as \( \lambda(\delta Z_i) \).

If \( P_i = 0 \) then there is no evidence of the selection bias and the regression reverts to OLS. But if \( P_i \neq 0 \) then there were omitted variables in the initial model correlated with \( X_i \) which is corrected by including the IMR in the second regression.

Studies in the relevant literature identified various individual-related, business-related and lender-related variables that are considered to be key determinants of the decision to participate as well as intensity of participation of households and small-scale enterprise owners. The effects of factors commonly measured include age, gender, marital status, educational level, family size, ethnic group, rural/urban, dwelling, household income and expenditure, distance from nearest bank, value of assets, profit from and expenditure on business,
legal status, size and age of business, training and awareness of formal microcredit service. As mentioned above information on a similar set of explanatory variables have been collected from the survey and included in the analyses as described in Table 1.

**TABLE 1. THE VARIABLES INCLUDED AND SUMMARY STATISTICS**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Mean</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Age of respondent in years</td>
<td>1.22</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Marital status</td>
<td>Dummy of value 1 if respondent is married and 0 if otherwise</td>
<td>0.80</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Gender</td>
<td>Dummy of value 1 if a respondent is male and 0 if female</td>
<td>0.19</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Other member of family has income</td>
<td>Dummy of value 1 if other member of family has income and 0 if otherwise</td>
<td>0.57</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Household income</td>
<td>Total amount of family income measured in Sudanese pounds *</td>
<td>12 443.48</td>
<td>15,000</td>
<td>27,500 *</td>
</tr>
<tr>
<td>Extra household income</td>
<td>Dummy of value 1 if respondent has extra source of income and 0 if otherwise</td>
<td>0.81</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Duration in business</td>
<td>Number of months in business</td>
<td>9.96</td>
<td>7</td>
<td>39</td>
</tr>
<tr>
<td>Training</td>
<td>Dummy of value 1 if respondent has received training and 0 if he has not</td>
<td>0.20</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Business size</td>
<td>Dummy of value 1 if size of the business is small and 0 if micro</td>
<td>0.58</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Accounting records</td>
<td>Dummy of value 1 if respondent maintains accounting records and 0 if otherwise</td>
<td>0.34</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Type of business activity</td>
<td>Dummy of value 1 if type is trade and 0 if otherwise</td>
<td>0.73</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Awareness of bank microcredit</td>
<td>Dummy of value 1 if respondent is aware of microcredit service and 0 otherwise</td>
<td>0.77</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Awareness of Murabaha</td>
<td>Dummy of value 1 if respondent is aware of Murabaha and 0 if otherwise</td>
<td>0.66</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Value of assets owned</td>
<td>Total value of business assets owned measured in Sudanese pounds</td>
<td>7 728.99</td>
<td>1,500</td>
<td>15,000 *</td>
</tr>
<tr>
<td>Member of a social group</td>
<td>Dummy of value 1 if respondent is a member of a social group and 0 if otherwise</td>
<td>0.43</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Working capital</td>
<td>Total amount of operating capital in Sudanese pounds</td>
<td>27 150.80</td>
<td>150</td>
<td>500,000 *</td>
</tr>
<tr>
<td>Dwelling</td>
<td>Dummy of value 1 if respondent lives in owned house and 0 if otherwise</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Home of origin</td>
<td>Dummy of value 1 if respondent’s home origin is Khartoum state and 0 if otherwise</td>
<td>0.27</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Zone</td>
<td>Dummy of value 1 if respondent’s business is located in Khartoum area and 0 if otherwise</td>
<td>0.42</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Number of workers</td>
<td>Number of workers employed in the business</td>
<td>1.80</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Collateral</td>
<td>Dummy of value 1 if respondent doesn’t have adequate collateral and 0 if otherwise</td>
<td>0.15</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Complicated and long procedures</td>
<td>Dummy of value if respondent perceives credit to be long and complicated</td>
<td>0.20</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

* At the time of the survey (2013) one US$ was equivalent to SDG 6 exchange rate.
* Source: Study survey data (2013)

**RESULTS AND DISCUSSION OF THE EMPIRICAL ESTIMATION**
Results of the Heckman two-step estimation of the influences of household, business and lender attributes on the probability and level of participation of MSEs in microcredit are reported and discussed in the following sections. The procedure was chosen for estimation to correct the sample selection bias as proposed by Heckman (1979). Because estimated regression coefficients are just values that maximize the likelihood function they are not reported here but were used for post estimation of the marginal effects of included variables (as reported in Tables 2 and 3 below) to facilitate direct interpretation and discussion of the results.

**Determinants of MSEs Owners’ Decision to Apply for Microcredit**

The Probit model employed for estimating parameters of determinants of participation in the first (selection) step performed very well with statistically significant error term statistics. The model has been checked for multicolinearity with test results for a Variance Inflation Factor (VIF) of 1.16 which indicates no multicolinearity problem. As can be seen from Table 2 the marginal effects of many key explanatory variables were statistically significant. The signs on estimated parameters seem to be consistent with expectations and the direction of effects found in the literature as discussed below.

Among the investigated household attributes this study found a statistically significant positive correlation between age of the household head and the probability of participation in microcredit. This result suggests that older owners of MSEs are more likely to participate in formal microcredit than their younger counterparts. While there seems to be a disagreement on the effect of age in the literature this study results confirm the most general finding of a positive influence of age (Mpuga, 2004; Okurut et al., 2005; Messah and Wangi, 2011; Sekyi et al., 2014; Okten and Osili, 2004). Some of the reasons for such effect argued in the literature include that as the age of MSE owner increases, most likely so does his experience, managerial skills and income generating capacity. It has also been suggested that formal financial institutions perceive older MSEs owners to be creditworthy because of their bigger capability to accumulate assets that can be used as collateral guarantee. As a result they are more likely to apply for credit from banks than younger ones who would most likely be just starting new businesses. Moreover, it has been argued that the chances for older people to apply for credit are high due to the high probability of success and low risk of default.

Gender was found to be an important factor in participation as the probability of women applying for formal microcredit is 45.3% higher than men. This could possibly be due to the fact that women are unable to access other credit markets due to reasons related to social barriers or a reflection of the fact that men have better ability to self-finance their enterprises or access other sources (e.g. informal) than women. We also note that female-owned micro firms form more than two thirds (62%) of the total sample size in this study suggesting females’ keenness to expand their micro businesses. This result is in line with the finding of a descriptive study in Sudan (UNICONS, 2006) which revealed that more than 50% of the formal microcredit clients are females. It is also consistent with findings of Dutta and Magableh (2006), Aga and Reilly (2011) and Okten and Osili (2004).

Results seem to suggest that as family income increases, the probability of applying for formal microcredit decreases. This may be an indication that an increase in family income reflects MSEs owners’ capability to self-finance their own business as well as household spending and hence have less need for running the risk of possible default in future repayments. The negative effect of family income on participation is further supported by the result that households with other members of the family earning income are less likely to apply...
for microcredit. This suggests that income earned by other members of the family assists with household spending and contributes to financing household business operations, which is common in the Sudanese society, hence reducing the need for borrowing. This finding is consistent with the results of Umoh (2006) but there is disagreement in the literature as other studies found a positive income effect on participation (Messah and Wangi, 2011; Doan et al., 2010; Magri, 2007, Muhongayire et al., 2013; Sekyi et al., 2014; Magri, 2002).

The study confirmed the importance of awareness which was found to positively influence the decision to apply for microcredit. The implication that MSEs owners who are aware of bank microcredit services are more likely to apply for loans than those who are not concurs with the findings of Dutta and Magableh (2006), Atieno (2001), Messah and Wangi (2011), Kashuliza and Kydd (1996) and Quoc et al (2012). Related to this is the finding that the probability of MSEs owners who are members of a social group applying for formal microcredit is 23% higher than those who are not. This may be because social networks facilitate sharing of information about credit opportunities thus lowering costs of search for credit sources and assist the many MSEs owners who often are not familiar with application procedures. This concurs with findings from Okten and Osili (2004), Kimuyu and Omiti (2000) and Quoc et al. (2012).

One key business related attribute is training, the effect of which was found to be positive as study results suggest that the probability of applying for microcredit among MSEs owners who received training on business is 37% higher than those who did not. This seems to imply that those who received training are more capable of spotting potentially successful enterprises and hence apply for microcredit in order to expand their businesses, which confirms the findings of Diagne and Zeller (2001). Another business related factor investigated is the correlation between record keeping and participation. The study found that the probability of applying for microcredit among those who maintain accounting records is 38% higher than among those who don’t. This may be attributed to the better business managerial and other skills among MSEs owners with accounting knowledge as well as capability of adopting technologies that give them an advantage when they apply for microcredit. This result contradicts with Aga and Reilly (2011) who found that MSEs owners who received training are less likely to access credit in Ethiopia.

| Variable            | Coefficient | Z    | P>|z|   |
|---------------------|-------------|------|-------|
| AGE                 | -0.228      | 1.99 | 0.047*** |
| GENDER              | -0.453      | -2.55| 0.011*** |
| FAMILY INCOME       | 0.000       | -3.99| 0.000*** |
| OTHER INCOME        | -2.279      | -1.96| 0.050*** |
| AWARENESS           | 2.226       | 5.56 | 0.000*** |
| NO OF EMPLOYS       | -0.102      | -1.91| 0.056*** |
| BUSINESS RECORDS    | 0.378       | 2.56 | 0.010*** |
| TRAINING            | 0.370       | 2.28 | 0.022*** |
| COLLATERAL          | -1.896      | -4.79| 0.000*** |
| COMPLICATED         | -1.600      | -5.20| 0.000*** |
| SOCIAL GROUP        | 0.230       | 1.66 | 0.097* |

TABLE 2: ESTIMATES OF MARGINAL EFFECTS OF HECKMAN SELECTION EQUATION OF DETERMINANTS OF MSES OWNERS’ PARTICIPATION IN FORMAL MICROCREDIT IN KHAERTOUM STATE, SUDAN
Results also indicate that as the number of employees increases by one unit, the probability of MSEs owners applying for microcredit increases by 10.2%. This may imply that the higher the number of employees the enterprise recruits, the more profit it generates and hence the owner is more capable of self-financing and have better access to sources of funding other than microcredit targeting relatively smaller business enterprises.

Lack of collateral was found to have a highly significant negative influence on the decision to apply for microcredit. Consistent with the literature, this implies that MSE owners are less likely to apply for microcredit because they cannot afford to secure collateral guarantee for banks as the availability of collateral is a key requirement in formal credit markets. Findings of most studies suggest that microcredit access problem is mainly created by the lending policies of the financial institutions one of which is collateral requirement (Messah and Wangi, 2011; Okurut, 2004; Atieno, 2001; Nasr, 2010; Dutta and Magableh, 2006; Pham & Lensink, 2008; Quoc et al., 2012). The effect of another lender related factor, complicated and long procedures showed high statistical significance negatively influencing participation. Our results suggest that MSEs owners are less likely to apply for formal microcredit because of the complicated and long procedures of processing applications by banks which is consistent with results found by Schmidt and Kropp (in Umoh, 2006) and UNDP and UNHCR (2009).

Location of the business (ZONE) was found to be a significant factor in participation as the study revealed that the probability of those whose businesses are located in Khartoum area applying for microcredit from formal sources is 48.2% higher than those whose businesses are located elsewhere within the state. This may be due to the fact that the number of bank branches in Khartoum area forms more than two thirds (62%) of the total number of branches in the state which is considered a key supply factor lowering transaction costs to clients associated with borrowers’ applications, e.g. waiting time for approval. This concurs with finding from Quoc et al (2012).

Results also showed home of origin to be factor of significance in the decision to participate in formal microcredit. The probability of MSEs owners whose home origin is Khartoum state applying for formal microcredit is 40.1% higher than the probability of those coming from other states of the country. This may be attributed to the fact that those from within Khartoum state are more aware of banking procedures as well as sources of capital goods and raw materials.

\begin{tabular}{lll}
\hline
ZONE & 0.482 & 3.26 & 0.001***
\hline
HOME ORIGIN & 0.401 & 2.74 & 0.006**
\hline
CONSTANT & -2.133 & -4.44 & 0.000***
\hline
Mills lambda & -1329.064 & -0.88 & 0.380
\hline
Rho & -0.185 & & 
\hline
Sigma & 7196.848 & & 
\hline
No of observations & 690 & Wald chi2(11) & 67.990
\hline
Censored observations & 525 & Prob.>chi2 & 0.000
\hline
Uncensored observations & 165 & & 
\hline
\end{tabular}

***, **, * denote significance at 1%, 5% and 10% respectively
Other variables such as level of education, type of activity and months in business and marital status have shown no statistical significance in influencing the decision to apply for microcredit, which seem to be consistent with results from Umoh (2006) and Aga and Reilly (2011).

The coefficient of the Inverse Mill’s Ratio (IMR) in the selection equation was negative but insignificant at 0.380 indicating that no sample selection bias exists in this case.

Factors Affecting the Level of Participation in Formal Microcredit

Results of the Heckman outcome (stage two) Tobit estimation are reported in Table 3. The multicollinearity check for this model shows a Variance Inflation Factor (VIF) of 1.21 which indicates no multicollinearity problem. While most household attributes did not seem to have statistically significant influences a number of key business-related characteristics appear to significantly affect levels/intensity of participation in formal microcredit measured by the amount of microcredit, in Sudanese pounds, an MSE owner had applied for.

Contrary to its positive effect on participation, awareness of the Murabaha mode of finance appears to have a highly significant negative influence on the amount of microcredit applied for. This seems to suggest that the Murabaha mode is considered a high risk option by those MSEs owners who are aware of this mode of finance, in particular, leading them to avoid the risk of default embedded in the procurement of larger amounts of microcredit or they apply only for as much amount of credit as they actually require to run their business.

Another factor with high significant influence was the value of assets indicating that as the value of assets of the MSE owner increases by one unit the level of loan applied for increases by 35%. This suggests that wealthier applicants are more likely to apply for larger amounts of microcredit. This may reflect the enterprise’s high cost of capital (i.e. high need for loans to meet associated higher operations and maintenance costs). It also seems to support a decreasing risk aversion attitude among these MSE owners as their degree of risk aversion declines with higher value of assets or wealth (higher willingness to take risk) which is consistent with the finding of Dutta and Magableh (2006). The above result seems to be further supported by the statistically significant positive effect of operating capital (WORKING CAPITAL) shown in Table 3. As the amount of operating capital employed in the business increases by one unit, the level of loan applied for increases by 2.7%. This may indicate that MSEs owners with larger operating capital need larger loans but are more confident and capable of repaying larger amounts of credit. Quoc et al (2012) found similar result.

Having extra income from sources other than the main MSE in question (e.g. wage from another job, family transfers, pension, charity,…etc.) appears to have a significant positive effect on the amount of loan applied for. Results indicate the probability that MSEs owners who have other sources of income are more likely to apply for larger amounts. This may be due to the fact that having other sources of income makes MSE owners confident enough to meet repayment of larger amounts of credit as well as their families’ consumption expenditure. It may also imply that with additional income an MSE owner may save more and hence acquire assets which can be used as collateral security to borrow from banks. This finding is consistent with result of Daniel et al (2013) who found that as total household income increases house hold gains confidence to increase level of borrowing as they are assured of repayment.

Study results also seem to suggest that as the business size increases the probability of applying for more credit increases. A small firm is larger than a micro one in terms of working capital, assets and in most cases the number of employees, and hence requires larger amounts of credit to meet higher operations’
expenses. This result contradicts with finding of Daniel et al (2013). The effect of frequency of application for microcredit (i.e. number of times applied for microcredit) was positive and statistically significant indicating that those who applied only once are more likely to apply for larger amounts compared to those who applied more than once. It is quite possible that MSE owners typically apply for larger loan amounts (overestimate their needs and lenders policies and limits) in their first attempt and with time and experience they learn more about what is more feasible (likely to be approved) and appropriate amount to apply for and hence adjust down levels. It is also possible that those who already obtained credit are more financially stressed to service the first loan and hence can afford to take on smaller loans.

This is further supported by the measured effect of training as results seem to suggest that owners of MSEs who received business training are more likely to apply for lower credit levels than those who did not. Once more indicating that with better training and experience MSE owners become better informed and able to determine the most appropriate loan size for their needs and repayment abilities.

The study also found a negative significant effect of ownership of a dwelling implying that MSEs operators who live in their own houses are less likely to apply for larger amounts of credit than those who live in rented houses, shanty houses, at workplace or with family and friends. This may be due to the fact that owners are most likely running their business activities at their owned premises whereas other groups have a need to rent premises to run their businesses and hence the need for larger loans.

Other business-related factors such as maintaining accounting records and age of business showed no statistically significant influences on intensity of participation in formal credit markets.

### TABLE 3. HECKMAN OUTCOME EQUATION TOBIT ESTIMATION RESULTS ON FACTORS INFLUENCING THE LEVEL OF PARTICIPATION IN FORMAL MICRO CREDIT IN KHARTOUM STATE, SUDAN

| Variable             | Coefficient | Z    | P>|z| |
|----------------------|-------------|------|-----|
| AWARE OF MURABAHA    | -6062.466   | -3.36| 0.001***|
| VALUE OF ASSETS      | 0.350       | 3.05 | 0.002***|
| EXTRA INCOME         | 2328.726    | 1.85 | 0.065*|
| WORKING CAPITAL      | 0.027       | 1.82 | 0.068*|
| BUSINESS SIZE        | 2372.675    | 1.73 | 0.083*|
| APPLIED ONCE         | 3832.768    | 2.23 | 0.026**|
| BUSINESS RECORDS     | 1244.738    | 1.02 | 0.307|
| TRAINING             | 2351.232    | -1.85| 0.065*|
| AGE OF BUSINESS      | -367.357    | -1.17| 0.243|
| DWELLING             | -           | -1.82| 0.068*|
| CONS.                | 9213.852    | 3.02 | 0.002|

***, **,* denote significance at 1%, 5% and 10% respectively
CONCLUSIONS AND POLICY IMPLICATIONS

This study employed Heckman two step sample selection model to analyze determinants of MSEs owners’ decision to participate and level of participation in formal microcredit in Khartoum state, Sudan. The study used cross section survey data from a sample of 690 MSEs owners. Influences of several factors measuring key household, business and lender attributes were found to be of high statistical significance on both the choice to participate and intensity/level of participation in microcredit. Signs of the estimated parameters were also consistent with expectations and in agreement with findings of relevant literature with new variables included and their effects tested here for the first time. While a number of household attributes were found to be important determinants of the choice to participate, most did not seem to have statistically significant influences on intensity in stage two of the Heckman selection estimation. Conversely a number of key business-related characteristics appear to significantly affect intensity of participation in formal microcredit measured by the amount of microcredit, in Sudanese pounds, an MSE owner had applied for.

Results of the study have important implications for microcredit policy and suggest various measures and reforms with high potential for enhancing the effectiveness and success of microcredit for SMEs in Sudan. One key finding relates to the effect of awareness of the predominant mode of microcredit, the Murabaha Islamic system. As expected, awareness appears to positively influence participation, however awareness of the existence of formal microcredit and the Murababa lending terms and conditions was found to be low (only 65%) among the surveyed MSEs population. This indicates the importance of more efforts to improve awareness and flow of information on microcredit procedures in general, particularly Islamic modes of finance such as the Murabaha contract. On the other hand, the effect of awareness on intensity of participation (amount applied for) was found to be negative with high significance and magnitude. This seems to suggest that the Murabaha mode is considered a high risk option by MSEs owners who are aware of this mode of finance substantially reducing their levels of demand for it, likely in avoidance of the perceived high risk of default associated with its adverse contractual repayment conditions. The policy implication of this result suggests a need to revise and reform the Murabaha mode and provide alternative lower risk options to increase intensity of participation.

Among the household attributes found to be of significance is the interesting finding on the influence of gender which revealed that MSEs and participation in microcredit among them in Sudan are dominated by women. This suggests the need to provide the necessary complementary support for strengthening business skills and entrepreneurship of women managed SMEs being the dominant beneficiaries and participants in the microcredit market. Other important household factors include economic status attributes such as income and ownership of a dwelling. Results indicate that MSEs run by households at higher income brackets are less likely to participate in microcredit markets reflecting their better ability to self-finance. It is accordingly important to target MSEs in the lower economic status segments by empowering such target group through increased awareness, training and other complementary innovative mechanisms that would improve their managerial abilities and access to microcredit.

Training on business management was found to have a significant positive influence on participation but reduces the level of demand for microcredit (amount applied for). This appears to suggest that training like awareness of the dominant mode of financing contributes to better ability to decide on the optimal size of the needed loan and assessment and management of risks associated with borrowing from formal credit sources.
This study also confirmed the importance of key business related factors such as maintaining accounting records, business size, value of assets and working capital, particularly for intensity of participation. The results tend to suggest that relatively larger and better managed MSEs, demand higher credit levels. Accordingly and consistent with above results this indicates that efforts and innovative measures to improve managerial skills of relatively smaller and less equipped firms are needed to increase participation and levels of demand for microcredit. This should go hand in hand with efforts and measures to ease the negative influences of important lender-related factors such as collateral, documentation requirements and loan processing time as revealed by the study. Policy innovations and mechanisms that can take advantage of social capital and introduce institutional arrangements to encourage group lending to well-organized and managed groups are recommended to overcome such constraints and reduce risks of default in absence of collateral guarantees for smaller size individual firms. Ways to improve lending terms and conditions by simplifying procedures and shortening loan processing time to better suit the diverse needs of MSEs need to be explored. Other financial mechanisms and products such as mandatory savings and money transfers as well as micro-insurance need to be experimented with and tested for complementing existing formal microfinance practices.

The study also revealed the importance of balancing the unequal distribution of bank branches in the state by opening more branches in the other two areas i.e. Omdurman and Khartoum North to improve access and reduce costs to potential MSEs clients in those areas. It is also important to consider the current bias against the relatively disadvantaged migrants from certain geographical locations of the country by instituting lending policies and effective awareness and outreach programs to strengthen their connection with and access to formal microcredit institutions, possibly through creation of special social networks and beneficiary groups (e.g. cooperatives, etc.).

APPENDIX TABLE 1. DESIGN AND DISTRIBUTION OF THE SELECTED SAMPLE BY STRATA (2013)

<table>
<thead>
<tr>
<th>Region/ Business type</th>
<th>Living mode/ Size of enterprise</th>
<th>Rural</th>
<th>Urban</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small</td>
<td>Micro</td>
<td>Total</td>
<td>Small</td>
</tr>
<tr>
<td>Khartoum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade</td>
<td>0</td>
<td>05</td>
<td>05</td>
<td>147</td>
</tr>
<tr>
<td>Production</td>
<td>0</td>
<td>00</td>
<td>00</td>
<td>012</td>
</tr>
<tr>
<td>Services</td>
<td>0</td>
<td>00</td>
<td>00</td>
<td>007</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>05</td>
<td>05</td>
<td>166</td>
</tr>
<tr>
<td>Omdurman</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade</td>
<td>0</td>
<td>00</td>
<td>00</td>
<td>128</td>
</tr>
<tr>
<td>Production</td>
<td>0</td>
<td>00</td>
<td>00</td>
<td>014</td>
</tr>
<tr>
<td>Services</td>
<td>0</td>
<td>00</td>
<td>00</td>
<td>022</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>00</td>
<td>00</td>
<td>164</td>
</tr>
<tr>
<td>Khartoum North</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade</td>
<td>5</td>
<td>05</td>
<td>10</td>
<td>049</td>
</tr>
<tr>
<td>Production</td>
<td>0</td>
<td>06</td>
<td>06</td>
<td>004</td>
</tr>
<tr>
<td>Services</td>
<td>0</td>
<td>00</td>
<td>00</td>
<td>013</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>11</td>
<td>16</td>
<td>066</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>324</td>
</tr>
<tr>
<td>Trade</td>
<td>0</td>
<td>06</td>
<td>06</td>
<td>030</td>
</tr>
<tr>
<td>Production</td>
<td>0</td>
<td>00</td>
<td>00</td>
<td>042</td>
</tr>
<tr>
<td>Services</td>
<td>0</td>
<td>16</td>
<td>21</td>
<td>396</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>16</td>
<td>21</td>
<td>396</td>
</tr>
</tbody>
</table>
c. Source: MSEs’ owners survey in the three areas of Khartoum State (2013)

ENDNOTES

1. Refers to mall-scale economic activity owned and managed by a sole-proprietor who employs a relatively small number of workers and the growth of the business depends on a self-generated income. They are traders, street vendors and service providers (Farah, 2005). In this study a small enterprise is defined as one with operating capital of more than SD 10,000 while a micro enterprise is defined as one with operating capital of SD 10,000 or less.

2. It is a kind of a sale in which the seller tells the buyer about the cost of a commodity and the profit he will get on the sale of that commodity before the transaction takes place. Repayment may be in lump sum, in installments or a combination of both (El-Gamal, 2000).

3. Refers to the activity of transforming raw materials into goods in order to be sold for profit.

4. Refers to the activity of purchasing goods in order to sell them out for profit.

5. Refers to the activity of rendering service for profit. This activity could also encompass manufacturing provided that the end user is a service recipient.

REFERENCES


Heckman, JJ 1976. ‘The common structure of statistical models of truncation, sample selection and limited dependent variables and a simple estimator for such models’. Annals of Economic and Social Measurement, Vol. 5, No. 4, pp. 475-492.


