DETERMINANTS OF DEMAND FOR AND SUPPLY OF CREDIT TO SMALL-SCALE ENTERPRISES AND PERFORMANCE OF FORMAL MICROCREDIT MARKETS IN SUDAN

By

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Dedication

To my late parents Talodi and Oum Elhasan

Declaration

I declare that this thesis, which I submit for the degree of PhD in Agricultural Economics at the University of Pretoria, is entirely my own work and has not been submitted anywhere else for the award of a degree or otherwise.

Two aricles of the thesis have been accepted for publication in international peer-reviewed scientific journals.

Any errors in thinking and omissions are entirely my own responsibility.

Signed.....

Name: Abbas Magboul
February, 2016

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Abstract

This study focused on three central themes of formal microcredit markets' performance in Sudan. The first theme analysed determinants of participation and level of participation of small-scale enterprises owners' in formal microcredit. The second theme analysed factors that determine institutional decision of approval and level of approval of formal microcredit to small-scale enterprises. The third theme addressed the perceived gap between supply and demand of formal microcredit to small-scale enterprises and the size of that gap. Analyses of factors determining demand for and supply of microcredit help identify and examine the perceived microcredit gap in Sudan. Thus, a data set including household, business and lender-related factors which was collected from 690 Micro and Small Enterprises (MSEs) in Khartoum State in Sudan, was used. This study focussed on the Murabaha Islamic Contract of credit, which is the most commonly used mode of finance by all commercial banks in Sudan and constitutes 97% of banks' total lending size. This contract is 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.

The study employed descriptive statistics as well as Heckman's two-step selection model. Two approaches were employed to address the above themes. First, Heckman's sample selection model was employed to analyse participation and intensity of participation of MSEs in formal microcredit markets. The same model was employed to analyse approval and level of approval of formal microcredit to MSEs in the state. Second, simple descriptive statistics were used to analyse the perceived gap between supply of and demand for formal microcredit to MSEs in the state.

Results of the participation (demand side) analyses suggest the need for policy measures and strategies to strengthen business skills of MSEs managed by women, lower income owners, and relatively disadvantaged migrants, through increased awareness of the existence of formal microcredit services,

training on business 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. The study recommended reform of the Murabaha mode of finance and provision of alternative lower risk options as well as balancing the current unequal distribution of bank branches to improve access and reduce costs to potential clients in currently lacking areas.

Results of the approval of microcredit loans (supply-side) indicate certain biases of the current microcredit supply system towards larger size, more skilled, higher asset endowed and higher income status MSEs which seem to strongly correlate with and reflect better collateral and repayment abilities. Appropriate innovative institutional and policy measures are recommended to balance such biases and improve access to and provision of microcredit to relatively smaller, less asset, income and skill endowed MSE operators and those migrating from relatively remote geographic regions with lower social networks and connections in Khartoum state.

Results of the perceived gap between demand for and supply of microcredit indicate that the problem is a low participation problem rather than a gap in the supply of microcredit. This problem is caused by key factors such as those revealed by findings of the participation analyses. These results seem to point to the fact that the main issue with outreach of microcredit in Sudan is to focus on critically examining and understanding factors behind such low participation rates (demand constraints). Availability of information and awareness about microcredit and providers' efforts to reach out could be key elements, among other factors, to be considered by policy makers. Policy makers are recommended to increase awareness of microcredit services as well as the Islamic modes of finance, particularly the Murabaha mode, among potential users of microcredit.

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Acronyms and Abbreviations

Abbreviation	Meaning
ABS	Agricultural Bank of Sudan
ACORD	Association for Cooperative Operations, Research and Development
ADRA	Adventist and Relief Agency
ANOVA	Analysis of Variance
ARDB	Animal Resources Development Bank
ADS	Area Development Schemes
AU	Administrative Unit
CAMEL	Capital adequacy, Asset quality, Management, Earnings and Liquidity
CARE	Cooperative for Assistance and Relief Everywhere
CBS	Central Bank of Sudan
ECCP	Elnuhud Cooperative Credit Project
FB	Family Bank
FCB	Farmers' Commercial Bank
GSLRP	Gash Sustainable Livelihoods Regeneration Project
GEP	Graduates Employment Project
GIRAFE	Governance and decision making, Information and management, Risk analysis and control, Assets, Funding and Efficiency and profitability
ICDB	Islamic Cooperative Development Bank
IDB	Industrial Development Bank
IDB	Islamic Develoment Bank
IOM	International Organization for Migration
KSDF	Khartoum Social Development Foundation
MEEIS	Medium Enterprises Equity Investment Scheme
MFU	Microfinance Unit
MON	Microfinance Organizations Network
MSE	Micro and Small Enterprise
NGO	Non-Governmental Organization
NKRDP	North Kordofan Rural Development Project
NPF	National Pensioners' Fund
OLS	Ordinary Least Squares
OXFAM	Oxford Committee for Famine Relief
PASED	Port Sudan Association for Small Enterprise Development
PMP	Pilot Microfinance Project
PSU	Primary Sampling Unit
RCTs	Randomized Controlled Trials
RECB	Real Estate Commercial Bank
ROSCA	Rotating Savings and Credit Association
SDC	Social Development Corporation
SDF	Social Development Fund
SHGs	Self-Help Groups
SIB	Sudanese Islamic Bank
SKPDP	South Kordofan Rural Development Project
SMDF	Sudan Microfinance Development Facility
SRADP	Southern Rosairis Agricultural Development Project

SPFS	Special Program for Food Security
SRDC	Sudan Rural Development Company
SSDB	Savings and Social Development Bank
SSU	Second Stage Sampling Unit
SWOT	Strengths, Weaknesses, Opportunities and Threats
UK	United Kingdom
UNDP	United Nations Development Program
UNHCR	United Nations High Commission for Refugees
UNHSP	United Nations Human Settlements Programme
UNICONS	United Consultancy
USA	United States of America
USU	Ultimate Sampling Unit
VIF	Variance Inflation Factor
WNB	Workers' National bank

CHAPTER ONE

INTRODUCTION

1.1. Background and motivation

Demand for small-scale financial services among the economically active poor in developing countries is strong, but lack of collateral and credit history seriously constrain their access. Formal financial institutions such as commercial banks refrain from providing services to low-income clients due to high transaction costs, uncertainty and information asymmetry (World Bank, 2008). This created a financing gap problem that induced researchers and governments in developing countries to explore ways and means of narrowing this gap. In Africa governments attempted to deal with the problem by introducing microfinance in bank and non-bank institutions. These institutions have always been requiring banking formalities that small businesses deem repulsive (Areetey, 2008). Microfinance is defined as the provision of financial services like credit, savings, insurance, funds transfer and payment services to low income households and small enterprises in both rural and urban areas, including employees in the public and private sectors and the self-employed (Robinson, 2001).

Like many other developing countries, micro and small enterprises (MSEs) in Sudan represent the economically active poor who need loans to finance their business activities. Their access to formal banking is constrained by the same factors mentioned above. As a result, they either resort to informal sources which are costly and risky or rely on their own meager capital.

An MSE is defined as small-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 between SD 10,000 and SDG 500,000 while a micro enterprise is defined as one with operating

capital of SD 10,000 or less [At the time of the survey (2013) one US$ was equivalent to SDG 6 exchange rate].

Demand for microfinance by 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. 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, 2006a). The growing demand for products of small business sector is attributed to the high influx of rural-urban migration due to armed conflicts and other natural disasters. Secondly, the high cost of living has led large numbers of poor and low income people to engage in self-employment activities besides their jobs 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 driven to seek self-employment activities (UNICONS, 2006a).

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 credit policy in 1994, which directed banks to allocate 5 percent of their portfolio to microfinance (CBS, 1994). Nevertheless, microfinance lending (microcredit)[1] up to the end of 2011 did not exceed 1.7 per cent of the total volume of the portfolio of most banks except for very few banks specialized in microcredit lending, namely the Family Bank and the Savings and Social Development Bank (UNICONS, 2006a). Some other nongovernmental organizations, social

[1] Refers to small loans extended to individuals and entities that would otherwise not be able to obtain any type of credit. Microcredit and microloan are used interchangeably in this study.

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 conduct studies on the causes. A survey of MSEs in Khartoum state indicated that 93 percent of the respondents, despite their demand for credit never received loans from either formal or semi-formal institutions (PlaNet Finace, 2007). Another study that covered four states showed that 91 percent 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 and its unsupportive policies to small businesses due to excessive taxes, fees and other regulatory pressures (UNICONS, 2006a). At the micro level, banks are reluctant to do business with the poor. Although some microfinance specialized banks are active in mobilizing savings, they are not attracted to provide credit to small businesses because of the Islamic law that prohibits interest payment. Nonbank microfinance institutions, which mainly depend on local and foreign donations, suffer from limited resources as well as lack of training and experience. At the meso level, lack of guarantee systems and apex bodies to support microfinance is cited as one of the factors that hamper the progress of the sector (PlaNet Finace, 2007; UNICONS, 2006a).

Other studies found that 77 percent of the surveyed MSEs borrow from informal sources due to lengthy and complicated banking procedures (UNDP, 2010). The main conclusion of these studies is that there is a large microfinance supply-demand gap in many regions in Sudan. Most of the MSEs surveyed described microcredit offered by banks as inadequate and unaffordable, and as a result most of the micro-credit services take place within the informal economy (UNDP, 2010; PlaNet Finace, 2007; UNICONS, 2006a).

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 influences of individual, business and

lender-related factors especially cost-to-client on MSEs owners' decision to participate in formal microcredit and intensity of that participation. On the supply side, the mentioned studies have not analyzed the effect of factors determining formal lenders' decision of approval and level of approval of microcredit to MSEs owners and transaction costs associated with microfinance institutions (cost-to-serve) among others. Furthermore, the existence and extent of supply-demand gap of microcredit among the different borrower groups have not been analyzed by these studies. The present study intends to contribute to bridging these gaps in current knowledge about the apparently failing microcredit policies and regimes in Sudan. The study aims to achieve these objectives by adapting existing analytical approaches and empirical models of relevance to investigate causes of the poor performance of microfinance in Sudan. 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.

1.2. Problem statement

Small-scale enterprises have received growing attention world-wide at both local and international levels during the last decade. They have been the concern of many policy-makers attempting to accelerate the development process in low income countries. A number of projects have been launched in different countries of the world to help these countries alleviate poverty especially among the economically active poor. The most important of these initiatives is extending credit to MSEs, the focus of this research. Credit accessibility problems have been most frequently cited in the literature as detrimental to initiatives of poverty reduction. Thus, extending credit to those who had been considered "unbankable" by the formal banking system proved to be feasible in most parts of the world. One of the most prominent examples of alleviating poverty through credit is the Grameen Bank of Bangladesh established in 1974 which was successfully emulated in many developing countries.

As stated earlier the number of MSEs is rapidly increasing in Sudan especially in Khartoum State. The actual number of these enterprises is

lacking, but it is remarkable that more and more people both employed and unemployed, are forced to start their own formal or informal MSEs especially those to which there are no barriers to entry. This has become an alternative option for these people to generate additional earnings to augment their meager incomes.

Small-scale businesses (MSEs) in Sudan have been the primary absorber of labor force over the past years and the main source of income for most of the people who do not find job opportunities in both the private and public sectors. MSEs are also the major providers of products and services for local markets, particularly low-income segments with limited purchasing power (UNICONS, 2011). Despite this significant role, the sector has over the years experienced many constraints that have impeded realization of its full potential. Limited access to financial services has been identified as a major constraint. As a result, the majority of MSE owners confine themselves to narrow markets with low profit margins due to intensive competition. Consequently, most of these MSEs stagnate, contract or close down after a few years of operation and very few succeed to graduate to medium and large-scale levels. Credit accessibility problems are also likely to aggravate difficulties with initiatives of poverty reduction. In view of the challenges pointed out in previous relevant studies, the need was felt to investigate the extent of the current microcredit gap and analyze factors that influence demand for and supply of microcredit in the country.

1.3. Research questions to be pursued

As noted above, previous research provided little if any information about determinants of the failing of microfinance to support small businesses in Sudan. To address this gap in the literature, it is necessary to investigate influences of key factors linked to the demand for and supply of microcredit to understand what is behind the existing gap that limits formal microfinance lending (microcredit). It is also important to analyze how the failing microfinance experience of Sudan could be turned around to become effective in poverty reduction and promotion of social and economic development.

The following research questions are accordingly advanced to guide the intended research study:

(1) Is there a gap between demand for and supply of microcredit in Sudan? And how large is that gap for different borrower groups?
(2) What factors determine demand for microcredit by small enterprises in Sudan?
(3) What factors influence microcredit supply institutions' approval decisions, regulations and strategies in Sudan including credit rationing?
(4) What policy reforms are needed to increase access of MSEs and improve performance of Sudan's microcredit market?

1.4. Objectives of the study

The main objective of this study is to analyze the performance of microcredit markets in Sudan in order to enable the sector to play a lead role in economic development and poverty reduction. To achieve this main purpose, the study will pursue the following specific objectives:

(1) Examine and measure the extent of the current microcredit gap among different borrower groups.
(2) Identify and measure the influence of factors driving demand for microcredit by MSEs in Sudan.
(3) Identify and measure the influence of factors driving supply and rationing of microcredit in Sudan.
(4) Identify potential options for improving current policy measures to enhance the role of microcredit in supporting economic development and improved wellbeing among small business owners in Sudan.

1.5. Hypotheses of the study

In its endeavor to address the research questions raised above, the study intends to test the following hypotheses:

(1) A significant gap currently exists between demand for and supply of microcredit for all potential borrower groups.

(2) Lack of information and awareness about availability of microcredit services among needing clients are key limiting demand factors.
(3) Perceived low economic status of clients in terms of owned assets and other business attributes (e.g. lack of sufficient collateral, low expertise and basic business skills) reduce the probability of effective access to microcredit.
(4) Social capital and value systems are important determinants of microcredit rationing.

1.6. Approach and methods of the study

Given the above stated objectives and hypotheses of the study, this research intends to adopt and apply available analytical approaches and empirical models to investigate determinants of supply and demand for microcredit in Sudan. On the demand side, the study will measure and analyse the influences of individual, business and institutional attributes on MSEs owners' decision to participate and intensity of participation in formal credit markets. Similarly, the study will investigate influences of key factors on supply decisions of approval and levels of microcredit to be provided by formal lenders to MSEs. The study will also attempt to measure the current gap between supply and demand for microcredit among various groups of borrowers. Emphasis will be on the Murabaha Islamic Contract (MIC)[2] of credit which is the most commonly used mode of finance by all commercial banks in Sudan and constitutes 97% of banks' total lending size (UNICONS, 2006a; Abukasawi, 2011) (see section 3 for detailed discussion on Islamic rules and modes of finance).

The Khartoum State is selected as the case study area because that is where microcredit markets and the bulk of MSEs are concentrated. There are 41 banks currently operating with 517 branches countrywide, 61% of which are

[2] 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).

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 (CBS Report, 2014).

1.7. Organization of the thesis

Chapter two provides a review of the available literature on supply of and demand for microcredit. Chapter three presents an overview of microfinance institutions and operations in Sudan and the Islamic banking and rules to MSEs finance. Approach of the study and sources and methods of data collection are presented and discussed in chapter four. Determinants of small-scale business owners' participation and level of participation in formal microcredit markets in Sudan are analyzed in chapter five. Chapter six presents the key factors influencing formal credit providers' decision to supply and ration access to microcredit, analysis of the existence and magnitude of the perceived supply-demand gap in formal microcredit markets and other attributes of the potential microcredit users in Sudan (cost-to-client and repayment performance). Chapter seven presents summaries, conclusions, policy implications and limitations of the study.

CHAPTER TWO

REVIEW OF RELEVANT LITERATURE

2.1. Introduction

Microfinance emerged as an economic development approach intended to serve low-income people, and has now been widely used to boost economic development and reduce poverty particularly in developing and transitional countries. The literature indicates that microfinance has significant positive impacts on income (Khandker *et al.*, 1998), assets (Montgomery *et al.*, 1996), expenditure (Khandker, 2003), educational status (Chowdhury & Bhuiya, 2004), health (Pitt *et al.* 1999), and gender empowerment (Hashemi *et al*, 1996). Other studies show that access to finance reduces financing constraints for small firms (Beck *et al.*, 2005; Beck *et al.*, 2006; Beck *et al* 2008), promotes more start-ups and enables incumbent small firms to exploit growth and investment opportunities (Klapper *et al.* 2006), and allows the choice of more efficient asset portfolios and innovation (Maksimovic *et al.*, 2007). Robinson (2001) argued that financial services help the economically active poor improve household and enterprise management skills, smooth income flows, increase productivity, enlarge and diversify their microenterprises and increase their incomes. Other studies suggest that microfinance is good for micro-businesses but the overall effect on income and poverty of microfinance users is less clear (Odell, 2010).

Duvendack *et al.* (2011) suggest that almost all microfinance impact evaluations suffer from weak methodologies and inadequate data and hence need to be re-investigated. Using a number of case studies from across the world, Bateman (2010) has a more pessimistic argument that microfinance constitutes a major barrier to sustainable economic and social development and thus poverty reduction. Furthermore, he indicates that microfinance has been valued and promoted for its ideological and political usefulness in the era of Neoliberalism and is no more than a myth.

Lack of access to appropriate and usable financing is most frequently cited in the literature as a constraint to small-scale businesses' development and poverty reduction and the main reason behind the financing gap in developing countries. This perceived gap has been attributed to factors on both supply and demand sides of the sector. The following sections review the available literature on demand for and supply of microcredit. Studies that have been conducted on demand and/or supply sides of microcredit markets and methods used to analyse supply and demand factors influencing access to microcredit (availability and participation) are reviewed with the objective of identifying the research gaps that may exist in the existing body of knowledge.

2.2. Studies on determinants of demand for microcredit (participation)

Most studies use the concept of credit access and credit participation interchangeably though access to credit differs from credit participation. Access to credit means that an individual is both able to borrow and can satisfy the lending requirements of lenders regardless of whether he borrows or not. A household that has actually participated in borrowing activities has effective access to particular credit sources, whereas a household having access to credit may choose whether or not to participate in borrowing programs (Doan *et al.*, 2010). According to Diagne (1999) credit participation in borrowing programs is more related to potential borrowers' choice on the demand-side, whereas access to credit is more related to potential lenders' choice on the supply-side. Access to financial services is thus distinct from usage as an individual may have access but may choose not to use it.

Microcredit demand studies employed a range of analytical and empirical approaches and methods. The bulk of the literature on demand for microcredit is empirical. Some of the empirical studies however, have attempted to base their empirical models on behavioural assumptions from economic theory (Mpuga, 2004; Fabbri & Padula, 2002; Magri 2002) whereas the majority developed their empirical specifications based on pragmatic or more ad hoc assumptions.

Constrained utility maximization was used as the theoretical framework in the study by Fabbri and Padula (2002) who introduced minimum repayment requirements and tested for the influence of judicial system efficiency on access to credit. On the other hand, Beck and Torre (2006) adopted access possibilities frontier framework to evaluate the outreach of a country's financial system and design policies to increase access and outreach of lending services. A number of the microcredit demand studies used simple descriptive statistical methods, e.g. cross-tabulation, tests of differences between means and analysis of variance (ANOVA) to analyse participation in credit programs (Atieno, 2001; Guangwen, 2008; Shah *et al.*, 2008). Other studies used Randomized Controlled Trials (RCTs) to estimate price and maturity elasticity of demand for consumer credit as well as evaluate the impact of microfinance programs or the effect of a new product or policy (Karlan & Zinman, 2009; Gine & Karlan, 2009; Karlan, 2006).

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. Several studies have been undertaken to analyse determinants of demand for credit and amount of credit borrowed employing combinations of the above models.

Logistic models (binary and multinomial) were used to analyse determinants of credit participation in rural Pakistan (Shah *et al.*, 2008), among small farmers in Zanzibar (Mohamed in Li, 2010), and among small enterprises in Turkey (Duman, 2009), and to study determinants of the choice between alternative sources of finance in Kenya (Messah & Wangi, 2011), Ghana (Sekyi *et al.*, 2014), South Africa (Okurut, 2006) and Uganda (Mpuga, 2004). Probit formulations were employed by Umoh (2006) to study small business owner's access to microcredit in Nigeria and by Zeller (1994) in Madagascar and Aga and Reilly (2011) in Ethiopia. Okurut (2006) employed a Heckman Probit model to correct for sample selection bias in his study on participation in microcredit by the poor and among blacks in South Africa. The two-stage

choice selection model was also used by Nguyen (2007) to study credit participation in rural Vietnam, by Mpuga (2004) in Uganda, by Diagne and Zeller (2001) in Malawi, by Duta and Magableh (2006) in Jordan, by Daniel *et al*. (2013) in Kenya and by Bendig *et al*. (2009) in Ghana.

Results of the above studies identified a large number of geographic, demographic and socio-economic factors determining whether a small-scale business operator or a household applies for credit or not. Age and education levels were found to have a positive influence on demand for microcredit (Zeller, 1984; Mpuga, 2004; Okurut *et al*., 2004; Messah and Wangi, 2011; Duman, 2009; Sekyi et al, 2014). Other researchers had different conclusions such as the finding that informal money lenders usually advance credit to individuals whom they trust regardless of their education level, which suggests that education may not be that important for one to obtain credit from informal sources (Cox & Jappeli, 1993; Crook, 2001; Barslund & Tarp, 2008). This is further supported by Umoh (2006) who found an inverse relation between income and education levels of the business owner and demand for credit.

Married individuals are more likely to apply for credit and their applications are more likely to succeed compared to unmarried applicants and household size was found to have positive impact on the demand for credit (Mpuga, 2004). This result however was not supported by findings of other studies indicating that household size does not affect demand for credit (Barslund and Umoh, 2004; Mpuga, 2004; Barsland & Tarp 2008). This is further confirmed by results from Messah and Wangi (2011) who found that the higher the number of dependents the more is consumption expenditure and hence the ability of saving income for loan repayment is limited. Interestingly, Aga and Reilly (2011) found that male-owned firms in Ethiopia have lower access to credit (participation) than those owned by women, possibly because microfinance institutions target female-owned enterprises.

Studying the influence of factors related to business attributes, Duman (2009) concluded that access to microcredit is very limited for small enterprises in Turkey. Diagne and Zeller (2001) found that the composition of household

assets is a more important determinant of household access to formal credit than the total value of assets or land holding size. Non-price attributes of lending institutions i.e. characteristics of their financial products other than interest rate play a great role in attracting participation. The findings indicate that formal credit is used to finance agricultural production and nonfarm activities while informal finance is used for consumption smoothing (Diagne & Zeller, 2001). Collateral, application procedures and repayment schedules have considerably constrained demand for credit among the poor from formal sources and forced them to resort to informal sources and personal savings (Atieno, 2011). The same study of Atieno (2011) revealed that lack of information about the existence of credit and lack of required security were the major reason for not seeking credit by small-scale enterprises in Kenya. These results are consistent with the findings of Messah and Wangi (2011), Okurut *et al.* (2004) and Mpuga (2004) who showed that households with higher income are more likely to demand credit from formal sources because they succeed in accumulating collateral to secure loans. Cox and Jappeli (1993) and Crook (2000) confirmed that household wealth is an important determinant of demand for credit and that business formality positively and significantly affects a firm's access to credit. Aga and Reilly (2011) found that motivated business owners are more likely to have better access to credit than those owned by less motivated owners.

The study of Aga and Reilly (2011) indicates no relationship between the sector in which the firm operates and its demand for credit. Their study however, found that informal firms are more likely to be credit constrained than their formal counterparts and that maintaining accounting records increases a firm's likelihood of access to credit. Messah and Wangi (2011) could not find significant variability of credit demand by different types of activities (trade[3], manufacturing[4] and services[5]) in small business sectors.

Refers to the retailing activities of purchasing goods in order to resell them for profit e.g. street vendors, small grocery shops, etc.

[4] Refers to the activities involving transforming raw materials into goods in order to sell them for profit e.g. carpentry, handicrafts, shoemaking, etc.

[5] Refers to the activities of rendering service for profit e.g. small restaurants and food and tea vending, small local transport, small mechanical and other repairs and maintenance workshops, barber, tailor, etc

On the other hand, Mpuga (2004) found that individuals engaged in management, industry and commercial activities are more likely to apply for credit compared to those engaged in agriculture.

Togba (2009) introduced two variables to proxy lack of trust in microfinance institutions and sensitivity of households to higher interest rates and both were found to contribute to reduction of household's participation in micro-credit programs in Cote D'voire. This same study revealed that time of loan maturity positively affects participation of households in credit programs. Messah and Wangi (2011) found that interest rates charged and collateral required by formal credit institutions are inversely related with credit borrowing and success of getting it in Kenya. Ahmed (2002) identified cost-to-client, which includes both prices of loan and transaction costs incurred by the user, as an important determinant of credit demand. The study indicated that transaction costs include both non-cash opportunity costs such as the value of time to get and repay a loan and cash expenses related to obtaining a loan such as documentation, food and taxes. Coetzee (2012) identified financial, economic, social and cultural, psychological, and regulatory and compliance components of cost to clients determined at the macro (enabling environment), meso (industry context) and micro (service providers) levels. He emphasised the importance of decreasing both cost-to-client and cost-to-serve for more financial inclusion.

Social networks, particularly in rural areas, facilitate flow of information about credit market participation opportunities thus lowering costs of search for credit sources (Okten & Osili, 2004). This is confirmed by Kimuyu and Omiti (2000) who also found that distance from source of credit negatively affects demand for credit. Zeller and Sharma (in Zeller & Meyer, 2002) pointed out to the positive effect of experiencing external shocks on demand for loans. This is consistent with results of Nguyen *et al.* (2002) who found that many borrowers in Burkina Faso take small loans to restart a business after a break that have resulted from adverse times.

Evidence from empirical literature suggests that besides demand factors that determine firms' access to credit, institutions' lending policies may also be

crucial to credit demand (Bigsten *et al.*, 2000; Umoh, 2006). Schmidt and Kropp (in Umoh, 2006) argue that the problem of credit access is created by the lending institutions reflected in their complicated procedures, prescribed minimum loan amounts and restriction of credit for specific purposes. Other studies indicated that small enterprises face higher financing obstacles than larger enterprises (Beck, 2007; Beck & Demirguc-Kunt, 2006) as banking systems underserve smaller firms. Studies also show that obstacles of smaller firms' financing have almost twice the effect on their growth as constraints experienced by larger ones. The same studies suggest that financial and institutional development help enhance MSEs growth and increase their access to external finance and thus levels the playing field between firms of different size.

2.3. Studies on determinants of access to microcredit

A large number of rating agencies have emerged adopting different methods based on accounting information to assess the operational, social and financial performance of microfinance institutions in terms of sustainability and efficiency (Nieto & Cinca, 2007). Three examples represent the main methods commonly used in performance evaluation of lending institutions. The first is known as the CAMEL method adopted by Accion International, a not-for-profit network based in the US. This method assesses 21 indicators for 5 areas: capital adequacy, asset quality, management, earnings and liquidity management from which the acronym comes (Nieto & Cinca, 2007). The second rating and evaluation method developed by the Planet rating agency, a French not-for-profit organization, is known as GIRAFE an acronym for governance and decision-making process, information and management tools, risk analysis and control, assets including loan portfolio, funding (equity and liability) and efficiency and profitability. A third common evaluation method uses strengths, weaknesses, opportunities and threats strategic analysis (SWOT) to evaluate the performance of microfinance institutions. Roy (2011) adopted this method to assess the performance of microfinance institutions in India.

Lack of standardization is one limitation of these rating methods as different rating agencies use different scales for the same institution. Another limitation is that the rating methods fail to assess the social performance of microfinance institutions due to the difficulty of obtaining data about the number of poor people served and how their lives change with the microfinance service. Moreover, the rating methods are mainly used to provide information to supervisors, funders and networks to monitor microfinance institutions as well as to potential investors in these institutions (Reille *et al.*, 2002). However, these methods do not formally model credit supply behavioural relationships and their structural determinants.

Fatoki and Smit (2011) found that all four factors internal to the enterprise (managerial competencies, collateral, networking and business information) are important constraints to credit access from commercial banks while only the first three factors are important constraints to access from trade creditors. They found four of the five external factors studied (macro-economy, ethical perception, legal system and crime) to be important constraints for credit access from trade creditors while only two external factors were found to be important for credit access from commercial banks in South Africa.

Several studies indicate that credit markets are characterized by information asymmetry and poor contract enforcement mechanisms resulting in a credit gap trapping those who cannot access formal sources of credit (Wenner, 1995; Sharma & Zeller, 1997; Zeller, 1998; Paxton *et al.*, 2000; Hermes *et al.*, 2005; Karlan, 2007; Cassar *et al.*, 2007; Binks & Ennew, 1996). Studies show different alternative methods of lending that are used by some prominent microcredit lenders, like the Grameen Bank in Bangladesh, to overcome problems of asymmetric information associated with credit markets such as group lending, provision of incentives, frequent repayment instalments and other complementary incentive mechanisms like collateral substitutes (Armendariz & Morduch, 2005; 2010). Another problem that lenders face is loan contract enforcement due to inadequate or lack of legal mechanisms to ensure repayment, especially in rural and urban sectors in developing countries where small businesses dominate. Also the use of collateral as a solution for the information asymmetry problem is constrained

by the limited available assets possessed by low income people in such areas (Hassan, 2002).

A number of theoretical models dealt with moral hazard and monitoring problems and confirmed that joint liability group lending leads to more effective screening, monitoring and enforcement among group members. Some of these models explicitly focus on the properties of joint liability lending related to mitigating information asymmetries (Stiglitz, 1990; Varian, 1990, Banerjee *et al.* 1994; Armendariz de Aghion, 1999; Chowdhury, 2005). Other models focused on adverse selection and screening (Ghatak, 2000; Gangopadhyay *et al.*, 2005) and others addressed the role of social ties within group lending in improving repayment performance of groups (Besley & Coate, 1995; Wydick, 2001).

According to Lensink and Hermes (2007), there has been little empirical evidence on whether and how microfinance helps reduce information asymmetry. They attributed this to the difficulty of obtaining reliable data on microfinance programs and the behaviour of their participants. In contrast to Stiglitz (1990) and Varian (1990) who focused on the informational advantages of group lending, Lensink & Hermes (2007) looked at borrowers' willingness to repay being the problem of enforcing repayment after some set of project returns has been realized, introducing extensive list of variables to measure screening, monitoring and enforcement within groups. Their analysis showed positive and negative effects of introducing group lending. The positive effects have been attributed to the possibility that successful borrowers may repay the loans of their partners who obtain poor returns to make repayment profitable while the negative effects may arise if the entire group defaults. This study also shows that if the group is formed from communities with a high degree of social connectedness, then this may constitute a powerful incentive and serve to mitigate any negative effects from group lending.

Karlan (2007) used a natural experiment to handle the endogeniety problem by exogenously creating groups with different levels of initial ties to analyse the actual impact of social ties on monitoring and enforcement efforts within

the group. The study finds that individual group members who have stronger social connections to other group members are more likely to repay their loans because they are able to monitor each other and enforce each other's repayment. Microfinance experiment approach, which allows disentangling social capital aspects within groups and their effect on group performance, was also employed by Cassar *et al.* (2007) who used a microfinance game at two different locations in South Africa and Armenia. Their results indicate that social and cultural homogeneity of group members improves repayment performance. They also found that specific trust between group members is more than trust in society as a whole. These results are consistent with findings of Zeller (1998).

Contrary to the above findings a study by Wenner (1995) suggests that social ties within groups reduce the pressure members put on each other to repay loans. A similar study by Paxton *et al.* (2000) of group-based lending programme in Burkina Faso showed that homogeneity of the group in terms of their ethnicity, occupation and income lowers repayment performance. This indicates that if members are more homogeneous they have lower incentives to screen, monitor and enforce each other and /or may start to collude against the programme. Using data from four group lending programs in Bangladesh, Sharma and Zeller (1997) arrived at similar results.

In his study of determinants of group repayment in Costa Rica, Wenner (1995) found that repayment performance of groups improves when their members have written formal rules stating how their members should behave. The same finding was reached by Zeller (1998) based on information from 146 groups in Madagascar. Sharma and Zeller (1997) also established that if borrowers are more credit rationed, repayment performance improves as groups are formed through a self-selection process which contributes to better repayment performance.

Moreover, the quality of the leader in running the group was found to be positively related to repayment performance (Paxton *et al.*, 2000). Similar results were obtained by Hermes *et al.* (2005, 2006) in their study of Eritrean lending programmes confirming the importance of monitoring and social ties

of the group leader in reducing moral hazard behaviour of group members. These findings were also confirmed by Wydick (1999) who also established that the average distance between group members negatively influences repayment performance, contrary to the findings of Wenner (1995) who found that if groups are located in remote areas, the possibility of access to alternative sources of credit is reduced and this consequently stimulates them to ensure group repayment as much as possible in order to have future access to loans.

According to Karlan (2007), the above-mentioned empirical studies provide interesting results on joint liability group lending but suffer from some weaknesses. Firstly, the link between theory and empirics is rather implicit. Secondly, crude measures are used to proxy complex constructs such as social ties. Thirdly, the analysis may suffer from endogeniety problems. To address some of these weaknesses, Ahlin and Townsend (2007), for instance, explicitly derived direct empirical tests from the well-known theoretical models of adverse selection, moral hazard and social sanctions. They found that repayment performance is negatively associated with higher levels of relatedness and sharing within groups as well as higher levels of joint liability but positively associated with the strength of local sanctions. They argued that the social ties between group members are not necessarily positive in promoting group repayment which contrasts the general view in the literature.

The existing literature on the supply of microcredit focuses almost entirely on group lending, while hardly paying attention to individual-based lending. Studies on systematic and rigorous comparison of group-based versus individual-based microfinance institutions are scarce (Lensink & Hermes, 2007). Cull *et al.* (2007) were the first to provide such a comparison. Their analyses indicated that individual-based microfinance institutions perform better in terms of profitability but the number of poor borrowers and female borrowers in the loan portfolio is less than that in the group-based institutions. Their study also showed that a rise in interest rate, above a certain limit, worsens the portfolio quality of individual-based lending whereas this does not affect the group-based microfinance institutions. The

Cull *et al.* (2007) study confirms that screening and monitoring by peers in group-based systems helps to circumvent moral hazard and adverse selection problems and suggests that as individual-based institutions grow larger, they focus increasingly on wealthier clients and this presents a mission drift but it is less so for group-based lending institutions. Using Randomized Controlled Trials (RCT), another comparative study between group-based and individual-based lending in the Philippines by Gine and Karlan (2009) argues that peer monitoring and peer pressure are unimportant for repayment performance and that institutional enforcement is sufficient to recover loans. They also support the argument of Cull *et al.* (2007) that individual liability allows for more growth and outreach for the lender.

Adopting credit rationing approach Okurut (2006) showed that banks incur high information costs in assessing the creditworthiness of small borrowers. This necessitated formal lenders to require strict collateral to minimize default risk, hence rationing out the poor and most of needy MSEs. Okurut (2006) further shows that interest rates fail to clear the credit market with credit rationing. Existing literature indicates that transaction costs are the main reason behind charging high interest rates by microcredit financiers. Shankar (2007) explained three kinds of costs incurred by a lending institution namely cost of the money lent, cost of financial practices and transaction costs. He further enumerates types of transaction costs as, identifying and screening the client, loan application processing, documents completion, loan disbursement, repayment collection and follow-up on non-repayment. Policy-makers impose usury laws against higher interest rates and this impedes long-term availability of credit for target groups due to high transaction costs which force institutions to exit the market and as a result potential borrowers resort to informal sources. Indirect transaction costs increase with the number of layers of fixed costs within the institution and that rural branches had lower indirect costs. Age of institution in business was found to negatively influence indirect costs. The Shankar (2007) study found that first year transaction costs are lower than subsequent year transaction costs as group formation and training costs are not recurrent after the first year.

Lin and Nuguent (1995) suggest that in communities with low social capital, credit providers pay higher administrative costs. Lianto and Chua (1996) found an inverse relationship between an organization's transaction costs and its age in business in Philippines. Srinivasan and Satish (2000) and Puhazhendhi (1995) found that NGOs and self-help groups (SHGs) serving as intermediary organizations reduced transaction costs of lending for both banks and borrowers in India. Swamy and Tulasimala (2011) using the cost allocation method found that the borrower incurs costs other than interest costs and other costs levied by the provider such as costs of visits to banks, cost of document collection, cost of applying for loan and cost of loan procurement. Their findings indicate that transaction costs for the poor are significantly higher under direct lending by banks.

Very few studies however, have adopted behavioural models to measure the relationship between the above factors and microcredit supply (Umoh, 2006; Rahji & Apata, 2006). Umoh's (2006) study of credit supply, based on the pioneering work of Stiglitz and Weiss (1981) of credit rationing, points out that interest rates charged by a credit institution play a dual role of selecting potential borrowers (leads to adverse selection) and affecting borrowers behaviour (leads to incentive effect). Umoh (2006) used the credit rationing approach to estimate factors that determine institutions' supply of credit in Nigeria. He specified the amount of loan advanced by the institution as the dependent variable whereas interest, collateral, repayment rate required, repayment period allowed, loan processing period, maximum loan amount and minimum balance allowed as independent variables. The method ignored the possible implications of the difference in the credit institutions' operational policies which is a limitation of the study. Rahji and Apata (2006) studied the supply of funds under the Small and Medium Enterprises Equity Investment Scheme (MEEIS) which was designed as an easy source of finance for small and medium enterprises (SMEs) in Nigeria. They found that interest rate and loan maturity are positively related to the probability of access to loans. In this study, enterprise previous profit, type of business, net worth and education of enterprise owner were found to be key determinants of supply of loans by the Scheme.

Sekabira investigated the impact of capital structure on operational and financial sustainability of microfinance institutions in Uganda. Results indicated that 86% of the said institutions had their funds from debt and grants which were negatively correlated to their sustainability. This finding is supported by Bogan (2012).

2.4. Mixed studies addressing both demand for and supply of microcredit

Other studies analysed both demand-side and supply-side factors that determine access to microcredit. Li (2010) used descriptive and logistic regression analysis to examine the key factors that influence accessibility to microcredit by rural households in China. His results show that supply-side factors such as high interest rates, documentation requirements and loan processing time impede households' accessibility to microcredit. Moreover, the individual lending model applied by the program creates problems of information asymmetry and to mitigate these problems the program uses a screening process that rations out many creditworthy potential borrowers. On the demand-side, results of the same study show that lack of knowledge of existence of the lending program negatively affects households' access.

Similarly, Vaessen (2000) used both descriptive statistics and logistic regression to analyse demand-related factors that influence access and found that education, household size and trading in agricultural and livestock products increase the likelihood of credit access whereas poor households are less likely to be clients of the bank. On the supply side, he found that flows of information and recommendations from a local committee, which was formed for this purpose, have substantially lowered costs of default risk, screening and enforcement.

Bali Swain (2002; 2007) studied the effects of household and farm productive characteristics as well as policy variables on the demand and supply of credit in India using a type 3 Tobit model and a generalized Double Hurdle model. She indicated two hurdles to be passed by a household in order for a loan to be observed as a market outcome (i.e. positive demand for a loan and access to a loan). Furthermore, she stated that household's access to the loan and

participation in the credit market depends on factors that determine the creditworthiness of the household as perceived by the lender. She argues that the microcredit loan approval is subject to the amount that the household demands as well as the lender's decision. Her results suggest that the size of the operational holdings, net-wealth, dependency ratio, educational level of the household and the wages and output prices are important determinants of the demand and supply of credit for farm households.

Dutta and Magableh (2006) investigated the socioeconomic determinants of demand for and supply of microcredit among micro-entrepreneurs in Jordan using Probit and Heckit methods. Their results supported the importance of awareness, education, age, gender, cost to serve and employment for participation in microcredit. On the supply side, their findings indicate that collateral, monetary savings and frequency of application are the main criteria for credit rationing by lending institutions. Similar results were reached by Pham and Lensink (2008) using Probit regression on information from both supply and demand sides in Vietnam. Their findings indicate that large size loans and a higher intensity of borrowing induce higher likelihood of repayment violation and informal lenders face a higher probability of default than semi-formal and formal lenders.

In addition to his analysis of determinants of credit demand in Kenya, Atieno (2001) used descriptive statistical methods to analyse supply-side factors. He found that despite the high number of potential borrowers who need credit, the lending terms and conditions of the formal credit sources prevent them from seeking credit, thus they resort to informal sources. Evans *et al.* (1999) identified supply-related and demand-related barriers to credit access. They used descriptive statistics to analyse health, demographic and socio-economic characteristics that influence access based on data from household survey. On the supply side, they used forward stepwise logistic regression to analyse factors explaining membership status in the rural programs.

Zander (1992) conducted a comparative study of nine loan components of formal and informal financial contracts in two survey villages of rural Sri Lanka. The study identified supply factors that determine access to include

flexibility of repayment, sanctions of non-repayment and mismatch of credit offered and loan needed. Moreover, borrowers' decisions to apply for a loan were influenced by prohibition of lending from previous defaults, requirement of collateral, finding a guarantor, psychological barriers against using a bank loan, personal knowledge between creditor and debtor and exclusion for political reasons. Guarantor arrangement and collateral requirements were found to be main barriers to rural credit markets while physical distance between households and sources as well as sanctions in case of non-repayment had no significant influence on borrowers' choice. The Zander (1992) study found that informal moneylenders disburse loans faster than formal ones do but at a relatively higher rate of interest whereas NGOs served their customers well in many aspects but their limited loan amounts were unattractive.

Poor quality of accounting records, business informality, lack of adequate collateral and lack of business skills have been cited as obstacles to microcredit in Egypt (Nasr, 2010). In this same study, small business owners cited supply-side obstacles that impede their access such as high interest rates, lack of Islamic profit-loss sharing financial products and burdensome loan application procedures.

In some recent literature it has been argued that the degree of effective credit rationing is not as high as is generally suggested and that farm households have a low demand for credit (Kochar, 1997). To empirically verify this finding, Bali Swain (2002) estimated three different models in her study of farm households in India. Her results indicate that access to the formal credit markets for the farm households is limited despite their high credit demand in these markets. Her results indicate that borrowers self-ration themselves because they expect that lenders will not give them credit. She indicates that credit policies have an important role to play in agricultural development.

Studies (Berger & Udell, 2002; Hirofumi *et al.*, 2006) discussed the impact of lending technologies on credit availability for small-scale enterprises. Studies indicate that financial institutions do not use appropriate financial technologies necessary for appraisal and monitoring of microfinance

operations. This is supported by Berger & Udell (2006) who argue that fianace staff in microfinance institutions have limited if any previous experience in undertaking microcredit operations. This situation is exacerbated by the fact that the SMEs target group are opaque as they lack credit history or complete track records and hence they are faced by the problem of credit availability. They suggested that better lending infrastructure can make considerable differences in credit availability for the SME sector through the use of the various lending channels such as financial statement lending, credit scoring and asset based lending.

2.5. The literature on microcredit in Sudan

A study conducted by PlaNet Finance (2007) based on a survey of micro and small enterprises in Khartoum state indicated that 93 percent of the respondents, despite their demand for credit, never received loans from formal or semi-formal institutions. UNICONS Consultancy ltd. (2006) conducted a study that covered four states where 91 percent of the respondents expressed their need for credit but due to lengthy and slow disbursement procedures they resort to informal sources. The study showed that specialized microfinance banks are active in mobilizing savings, but they have not been attractive to clients because of the Islamic law that prohibits interest payment on deposits. Some nonbank microfinance institutions, which mainly depend on local and foreign donations, also operate in the Sudan at a limited scale. This same study cited lack of guarantee systems and apex bodies to support microfinance as key factors hampering progress of the sector.

A study has also been conducted by the United Nations Development Program (UNDP) and the United Nations High Commission for Refugees (UNHCR) (2009) based on a survey of MSEs in two states of the eastern part of the country. This study indicated that 77 percent of their respondents borrow from informal sources due to lengthy and complicated banking procedures and 68 percent were reported to save at home as they considered saving at banks unattractive. The total number of outstanding micro-loans was reported to be 14 percent of the total portfolio of banks in the region. Moreover, a

survey conducted by UNDP, Tufts University and the International Organization for Migration (IOM) (2010) identified a microfinance supply-demand gap in Darfur region in the western part of the country as a major constraint to MSEs which constitute a majority of village-based farmers and nomadic pastoralists. Most of the MSEs surveyed described microfinance offered by banks as inadequate and unaffordable. According to the results of the same study, most of the micro-credit services take place within the informal economy. Another study conducted in one state in the eastern part of the country indicated that 59 percent of the respondents complained about the lengthy and complicated loan disbursement procedures of banks and 68 percent of the respondents said that banks mainly target only big businesses when providing credit (UNICONS, 2013). The most recent study conducted by Abukasawi & Widad (2014) on the portfolio of microcredit implemented by banks revealed that microcredit provision until June 2014 did not exceed 5 percent of the total lending portfolio of most banks except for very few specialized in microcredit lending, namely the Family Bank (FB) and the Savings and Social Development Bank (SSDB)

In a review on application of Musharaka Islamic Contract[6], also known as risk and profit sharing, by the Sudanese Islamic Bank (SIB) on small businesses, Abdallah (1999) indicated that banks prefer this contract when dealing with profitable businesses whereas Murabaha Islamic Contract, also known as purchase and resale plus mark-up, is preferred when dealing with non-lucrative businesses due to risk of default associated with the Musharaka contract (see section 3.3 for detailed discussion on Islamic rules and modes of finance).

Ahmed (2008) conducted an analytical and descriptive study, based on data collected from Islamic banks and MSEs in Sudan, to evaluate the role of banks in advancing loans to MSEs sector under Musharaka contract. The results indicate uneven distribution of banking facilities, particularly in rural

[6] This refers to an agreement signed by two or more partners. In simple terms, we can say it's a joint venture agreement. According to the percentage of capital invested, the profit is distributed between the partners. If the business faces some loss, the same ratio is used for the distribution of lost capital. In Musharaka, the working partner gets a larger amount of profit than the dormant partner (El-Gamal, 2000).

areas in addition to advancing short-term loans due to risk of default and as a result the profitability of MSEs is low.

Some studies on microcredit used different approaches to analyse the gap between demand for and supply of microcredit in Sudan at both local and national levels. A study conducted by UNICONS (2006a) in four states of the country indicated that the ratio of microcredit lending volume in each of the banks surveyed compared to its total volume of lending portfolio did not exceed one percent of the total volume of finance of most banks except some few banks such as the Savings and Social Development Bank, The Nilien Bank and the Agricultural Bank of Sudan. Another study in Khartoum State indicated that the market penetration of formal microcredit in the state is as low as 8 percent of the total potential market demand estimated by the study at $1.5 billion (PlaNet Finance, 2007).

Drawing from microfinance experiences in Sudan and around the world, a study guide conducted by the United Nations Development Programme (UNDP) and the United Nations Human Settlements Programme (UNHSP) (2002) revealed a microcredit institutional gap that a majority of the poorest segments of the population are outside the formal financial system due to the unbalanced geographical distribution of bank branches providing microcredit countrywide. The study indicated that the less educated and poor refrain from approaching the formal credit providers for psychological reasons presuming that they are not targeted by banking services. This same study also attributed the microcredit institutional gap to the fact that commercial banks do not budget for capacity building and thus expose their clients to repayment default. As regards the microcredit provided by the banks specialized in microcredit, this same study argued that the extent of poverty in most parts of Sudan is too big to be addressed by few institutions.

A survey by UNDP & UNHCR (2009) in two states of the eastern part of the country indicated that none of the formal financial institutions providing microfinance in these states managed to cover substantial segments of their potential clients in terms of geographical outreach in addition to the limited portfolios allocated for microcredit in the whole region. Another study in

Darfur region used the portfolio approach to identify the microfinance supply-demand in the region (UNDP, TUFTS University and IOM, 2010). This study revealed that the portfolio of 5700 loans allocated for microfinance in the region did not even reach one percent of the estimated market demand indicating a large formal microfinance gap.

Abukasawi and Widad (2014) argued that the banking sector has covered only 706,000 clients out of the total market potential demand countrywide estimated at 7-8 million clients. Another study by UNICONS (2013) in the three states of the eastern part of Sudan estimated the total outreach of bank clients in the three states at 400,000 clients representing around only 10 percent of the total potential market demand countrywide.

It is clear from the above literature study that a large supply-demand gap exists in the formal microcredit markets in Sudan and no comprehensive analyses of the extent of that gap among the different borrower groups have been examined. Moreover, no studies have been conducted on determinants of demand for and supply of microcredit. The present study will therefore attempt to employ descriptive statistics and model both supply and demand determinants of microcredit in Khartoum state with a focus on MSEs adopting a combination of the above cited analytical models and empirical approaches.

2.6. Summary

Most studies of determinants of demand for and supply of microcredit for small-scale enterprises reviewed the above adopted pragmatic analytical frameworks and approaches. Among the several models employed in the literature to analyse determinants of demand and supply of microcredit, choice models (Logit, Tobit) and truncated regression models (Tobit) stand out as the most common.

Demand decisions have been modelled and analysed in many ways in the literature. The two-step Heckman's selection model (1976) has been a common feature of studies of demand for microcredit. Multinomial logit and Probit models have been commonly employed to analyse decisions related to choice of credit source from several available options. Borrowers attributes

typically used to explain demand choices include business characteristics (legal status, type of activity, distance from nearest source of microcredit, years in business, value of assets, total annual income from and expenditure on business) and socioeconomic attributes (age, education, ethnic group, gender, marital status, family size, mode of living (rural/urban), religion, total annual household income and expenditures, other sources of supplementary income, how long in this location, etc.).

The literature survey above shows that few studies used behavioural analytical frameworks to model supply of microcredit. This is mainly due to the fact that provision of microcredit is policy-driven rather than being determined by market forces. The most common pragmatic empirical approach used in the literature has been the one conceptually based on the pioneering work of Stiglitz and Weiss (1981) on credit rationing which points out that interest rates charged by a credit institution play a dual role of selecting potential borrowers (adverse selection) and affecting borrowers behaviour (incentive effect). Loan size, maturity, terms of repayment, cost-to-serve, collateral and other terms of the contract have been found to exert significant influences on borrowers decisions as well as returns to the financial institution and hence lead to credit rationing.

Few modelling approaches have been employed to analyse credit supply under rationing. The amount of actual credit made available by lending institutions is in general used to measure credit supply, which will include zero values under rationing, i.e. for rejected applications. This implies a truncated distribution for the supply response variable and hence requires the Tobit specification commonly used for analysis of truncated choices. Borrower and lender-related characteristics (socioeconomic and business attributes of borrowing MSEs including cost to client and lenders' policy and selection criteria, and loan conditions including cost-to-serve factors) have been commonly used as key determinants of credit supply decisions.

Chapter three presents and discusses the current state of microfinance, the Islamic banking and rules to Islamic finance and a conceptual framework of MSEs financing by formal microcredit institutions in Sudan.

CHAPTER THREE

THE CURRENT STATE OF MICROFINANCE AND THE ISLAMIC BANKING AND RULES TO MSES FINANCE

3.1. Introduction

This chapter presents an overview of the current policy environment and state of microfinance in Sudan (Section 3.2). The chapter then provides brief discussion on Islamic banking and the rules to Islamic finance (Section 3.3). A summary section concludes the chapter.

3.2. The current policy environment and status of microfinance in Sudan

Sudan has introduced microfinance in commercial banks as a means of reducing poverty levels since the mid-1990s (Elhiraika, 1998). Some specialized commercial banks, namely the Agricultural Bank of Sudan and the Savings and Social Development Bank have provided microcredit services for more than 15 years. Other commercial banks have also been engaged in microcredit but their outreach has remained minimal. The microfinance sector in Sudan remains largely credit-based with very little practice of micro-insurance, micro-saving and money transfer. Some nongovernmental organizations, social funds and rural development projects have continued to be the main providers of micro-loans for the poor especially in the rural areas.

Following the introduction of microfinance in the commercial banks, the CBS launched a microfinance policy (CBS Policy, 1994) aiming at the provision of financial services to craftsmen, professionals & small producers including the productive families as a sector of special priority for financing. In order to achieve this aim, the strategy directed commercial banks to allocate 5 percent of their lending portfolio to microfinance. However, banks' outreach was limited due to the fact that they were hesitant to engage in microfinance due to the high transaction cost and the perceived high risk of default associated with low-income microfinance customers. Moreover, banks' experience in

such types of transactions was limited. Other reasons which contributed to the limited outreach include: a) the limited awareness among bankers on the potential of microfinance as a profitable and sustainable business and b) focus on deskwork and limited number of microfinance trained staff (Abukasawi, 2011).

Due to the weak performance of the microfinance sector, the CBS issued another strategy in 2006 to provide financial support, through an experimental wholesale financing program, to some selected 8 banks and two other non-bank financing institutions (the Khartoum Social Development Foundation and the Sudan Rural Development Company through the Industrial Development Bank). Capital was provided for the following financial institutions in order to engage in the program "named the Banks' Pilot Microfinance Project (PMP)":

- The Agricultural Bank of Sudan (ABS).
- Savings and Social Development Bank (SSDB)
- Animal Resources Development Bank (ARDB)
- Farmers' Commercial Bank (FCB)
- Islamic Cooperative Development Bank (ICDB)
- Workers' National Bank (WNB)
- Industrial Development Bank (IDB)
- Real Estate Commercial Bank (RECB)
- Khartoum Social Development Foundation (KSDF)
- Sudan Rural Development Company (SRDC)

Drawing from the results of the experimental programme, the strategy was expected to formulate clear guidelines and written plans for identifying organizations with good access to the targeted clients. Nevertheless, this has not been accomplished up to date. NGOs and Community-based Organizations (CBOs) have not been included in the wholesaling experience due to the constraints imposed by the CBOs Act (Article 51) and the Humanitarian Aid Act both of which limited deposit and profit taking financial transactions undertaken by non-bank microfinance institutions (Abukasawi, 2011).

In addition to the above-mentioned institutions, the Bank of Khartoum has been leading the Alaman Microfinance Fund, established in 2010, with a capital of $ 72,000 paid by the Zakat[7] Chamber (25%) and participating banks (75%) to finance the economically active poor as well as the social development projects. The Fund's profits are distributed as 20% for the leading bank and 80% for the shareholding banks according to the capital contribution of each (Survey data, 2013).

Following the establishment of the Microfinance Unit (MFU)[8] and the launching of Sudan Microfinance Strategy by the CBS in 2007, the overall situation of microfinance market in Sudan started to change, but very slowly. This strategy is characterized by the establishment of a financially and administratively independent MFU to adopt appropriate and well-studied legislations and policies conducive to development of the microfinance sector. Moreover, the MFU directed banks to increase their microcredit lending portfolio to 12% as well as establish departments specialized in management and provision of microcredit services to be rendered by trained staff (Study survey, 2013). Consequently, the microcredit portfolio implemented by banks increased from 1% in 2007 to 5% in 2013 whereas the portfolio implemented by nonbank microfinance institutions increased from 3% in 2007 to 23% in 2013 (Badr El Din, 2014). A recent report by CGAP (2013) has highlighted the financial inclusion of the poor achieved by Sudan through Sharia-compliant[9] microfinance practices, rating Sudan as the second country (after Bangladesh) in Islamic financing outreach and fourth in terms of total outstanding portfolios, worldwide.

In 2008, the CBS launched an initiative for establishing the Sudan Microfinance Development Facility (SMDF), which was registered in August 2009 as a private limited liability company incorporated under the 2003

[7] Payment made annually under Islamic law on certain kinds of property and used for charitable and religious purposes, one of the Five Pillars of Islam.

[8] An independent unit, both administratively and financially, at the CBS within the sector of financial institutions and systems. The unit is entrusted with drawing bank and non-bank microfinance policies and programs and developing of socio-economic banking with a view of encouraging the establishment of effective microfinance institutions and activities to alleviate poverty in society and to push forward productive activities to achieve balanced economic development all over the Sudan.

9 Microfinance practices which meet all of the requirements of Islamic law and the principles articulated for noninterest-bearing Islamic finance.

Sudanese Company Act with a capital of $20 million. Its main objective is to support new and existing semi-formal microfinance institutions in Sudan through the provision of best microfinance practices, technical assistance, training and wholesale financing (Badr El Din, 2014).

Most recently, the MFU announced the new Comprehensive Microfinance Strategy (2013-2017) which replaced all previous strategies and included all microfinance stakeholders nationwide. Drawing from the outcome of all previous microfinance strategies, this strategy aims at creation of an environment of appropriate microfinance policies and legislations, enhancement and support of microfinance institutions and establishment of supportive microfinance infra-structure. The strategy directed banks to continue allocation of 12% of their lending portfolio to microfinance. Two important features characterize this strategy. Firstly, the strategy announced establishment of a comprehensive insurance agency to provide insurance and guarantee documents to be accepted by banks for groups of borrowers who cannot afford to provide conventional collaterals. Secondly, the strategy recommended the establishment of a wholesale guarantee agency (named Kafalat), currently underway, to siphon wholesale finance from the CBS, donors and commercial banks to all licensed non-deposit taking microfinance institutions (MFU, 2015). According to Badr El Din (2014), this strategy is expected to increase the contribution of the microfinance sector to GDP from 1% to 3%, the number of microfinance clients from 494,000 to 1.5 million and the rate of women participation from 30% to 50% by 2017.

To highlight the current situation of microfinance, experiences of the main providers of microfinance in Sudan will be briefly presented below.

3.2.1. Providers of microcredit in Sudan

Microcredit over the recent past in Sudan has been primarily provided by four main categories of microcredit institutions as described below.

A. The banking sector

According to the CBS Annual Report (2013), there are 23 banks currently providing microcredit services and operating 517 branches countrywide. More than 50% of these branches are located in Khartoum and the central states. Such uneven distribution has denied access to microfinance services by the majority of potential microfinance clients in other regions, particularly in rural areas. Since the introduction of microfinance in the banking system, most banks have concentrated on the delivery of microfinance services in Khartoum state. For banks, Khartoum presented an appropriate infrastructure for microfinance operations compared to other regions of Sudan. 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.

Currently the commercial banks' implementation of microfinance is minimal. Exceptions are the Family Bank which is a 100% specialized microcredit institution and the SSDB in which microfinance operations represent more than 70% of its lending portfolio (Table 3.1). Compared to these two microfinance institutions, the implementation of all other banks is far below expectations (see Appendix 6).

Table 3.1 and Appendix 6 also present information on interest (named profit margin in Islamic banking) charged by each bank on Murabaha transactions after the approval of the CBS through the MFU (the same applies for non-bank microfinance institutions). While interest rates seem to be moderately high there appears to be no significant differences in rates charged by the different banks. Our survey unfortunately could not collect information from the MSE users of credit on other sources (semi-formal and informal) in order to establish shares of commercial banks compared to these other providers of microcredit.

Table 3.1. Rate of interest for banks providing more than 10% of their total loans' portfolio for microcredit in Khartoum State

No.	Name of bank	Profit margin (%)	Microcredit portfolio (%)
1	Family Bank	14	100
2	Savings and Social Development Bank	12.75	74.3
3	Agricultural Bank of Sudan	14	16
4	Exports Development Bank	14	14
5	Aljazeera Sudanese Jordanian Bank	12	13
6	Farmer's Commercial Bank	12	14.6

Source: (Study survey, 2013)

B. Nongovernmental organizations

Few of the non-governmental organizations (NGOs) currently operating in the country began the provision of microfinance in the 1980s but the majority started after 1991 following the announcement of the economic liberalization policy in 1992 (Abukasawi, 2011). Examples of NGOs engaged in microcredit, at both local and national levels, are the Association for Cooperative Operations, Research and Development (ACORD), the Adventist and Relief Agency (ADRA), the Oxford Committee for Famine Relief (OXFAM) and Cooperative for Assistance and Relief Everywhere (CARE). However, the outreach of the said programs is limited due to their dependency on external donors who dictate areas of operations for the programs. Moreover, dependency of these programs on external donors also negatively affects their sustainability due to the risk of sudden discontinuation of operations which deprives local communities from access to the financial services provided by the programs. Some of the NGOs which attempted to provide credit to the poor segments ended up with poor repayment performance and as a result most of them handed over their funds to some other local institutions to take over credit operations. ACORD NGO program stands out as having been relatively successful in credit provision since the commencement of its operations in 1990, nevertheless it has made a decision to phase out the ailing program in 2009 (UNDP & UNHCR, 2009).

The most sustainable local nongovernmental organization is Port Sudan Association for Small Enterprise Development (PASED) currently operating in the Red Sea State. Since its establishment in October 2000 as a locally

registered NGO, PASED has utilized microfinance delivery as the main tool for poverty reduction for the targeted communities in the Red Sea State. The program has been registered at the MFU as a non-deposit taking local NGO in 2010. It extends loans based on the principles of Islamic banking the most commonly applied of which is the Murabaha mode of finance with a profit margin (mark-up) of 2% per month charged as flat rate (i.e. a loan maturity of 10 months is charged a 20% mark-up). The program receives capital support in the form of loans from different national and international financial institutions such as the Islamic Development Bank- Jeddah through the CBS.

In addition to its core microfinance programme, PASED manages another non-financial services programme called the Learning for Empowerment against Poverty (LEAP) which aims to empower women in the state. This programme implements a set of complementary activities including women development and resource centres, capacity building, and a poverty loan fund. Currently the LEAP programme provides support to more than 31 existing active women associations at the state. For full details on the performance of PASED see table 3.2 below.

Table 3.2. The financial performance of PASED during the period 2012-2014

Details	2012	2013	2014	Growth rate
Number of loans disbursed	6728	7831	8905	32%
Amount of loans disbursed (SDG)	11,256,282	16,740,027	25,738,281	129%
Number of active clients	6005	7453	8494	41%
% of women served	65%	67%	68%	NA
Size of loan portfolio (SDG)	5,697,722	8,872,388	13,769,246	142%
Accumulated repayment rate (%)	99%	99%	99%	NA
Portfolio at risk (% PAR)	1.36%	1.70%	1.47%	NA
Percentage of written off loans (%)	0.90%	0.80%	0.63%	NA

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

C. Social Funds

A number of social funds in Sudan provide support to poor and low income groups, including women, the elderly, students, graduates, and pensioners such as the National Pensioners' Fund (NPF) and the Graduates Employment Project (GEP) which have had some limited experiences in provision of micro-loans.

The social funds started their microfinance activities between 1991 and 2000. Khartoum State established the Social Development Foundation (SDF) in 1997 and started operations in 1998 at the state level. The program has been very active in extending credit to grass-root clients as well as building the capacity of traditional rotating savings and credit associations (ROSCAs)[10] at the community level. The SDF has also initiated and facilitated the establishment of a Microfinance Organizations Network (MON)[11] which is currently taking another shape of an umbrella organization (UNICONS, 2006b). Some other social funds were established in most of the other states of Sudan but remained inactive due to the inadequate funding and limited staff training and capacity building.

D. Rural Development Projects

Several rural development projects, financed by international donors, are currently providing microcredit among integrated services in different parts of Sudan. The most well-known of these projects are the North Kordofan Rural Development Project (NKRDP), the South Kordofan Rural Development Project (SKRDP), the Special Program for Food Security (SPFS), and the Gash Sustainable Livelihoods Regeneration Project (GSLRP). Most of these projects, which also provide microcredit services such as ROSCAs, started their operations between 1991 and 2000. The main objectives of these programs are to enhance the productivity and improve

[10] It is group of individuals that fill the role of an informal financial institution through repeated contributions and withdrawals to and from a common fund. Members of the group pool their money into a common fund, generally structured around monthly contributions and money is withdrawn from it as a lump sum by a single member at the beginning of each cycle. This occurs for as long as the group exists.

[11] MON membership consists of 66 organizations involved at varying levels in microcredit including local credit and savings associations and registered as cooperative societies in addition to the Sudan Development Facility and some international nongovernmental organizations such as ACORD and Oxfam.

living standards of small-scale farmers and community groups operating farm and non-farm enterprises (UNICONS, 2006a).

Other projects were also established, at both local and national levels, during the last two decades but eventually phased out due to limited funding such as the Area Development Schemes (ADS), the El-Nuhud Cooperative Credit Project (ECCP) and the Southern Rosairis Agricultural Development Project (SRADP).

The following section presents discussion on Islamic banking and the different Islamic modes of finance used in financing MSEs.

3.3. Islamic banking and rules to MSEs finance

The Islamic financing system has been introduced in all financial institutions in Sudan since the early 1980s. Among the most important teachings of Islam for eliminating exploitation in business transactions, is the prohibition of all sources of unjustified enrichment. The prohibition of collection of interest (usury), referred to in Arabic as “Riba” is the most significant principle of Islamic finance. In Islam, lending money should not generate unjustified income. Riba refers to the premium that must be paid by the borrower to the lender along with the principal amount, as a condition for the loan or for an extension of its maturity, which today is commonly referred to as interest (named profit margin in Islamic terms). According to Sharia, the Islamic law of human conduct derived from the Muslims Holy Book “Qur’an”, Riba, in the Islamic economic system, represents a prominent source of unjustified advantage since the Sharia law considers money to be a medium of exchange and a store of value but not a commodity for exchange (Philip Gerrard, 1997; Ahmad & Ahmad, 2007).

According to Abukasawi (2011), loans provided by banks in Sudan are distributed between three main Islamic formulae: Murabaha, Musharaka and Mudaraba. A variety of methods and investment instruments, based on risk- and profit sharing, are employed in these Islamic financing regimes. A brief account of the major Islamic modes of finance is given below.

A. Murabaha (Cost-Plus-Mark-up)

Within a Murabaha contract, the financial institution agrees to fund the purchase of a given asset or good from a third party at the request of its client, and then re-sells it to its client with a mark-up profit. This financing technique is considered to be similar to the conventional, interest-based finance. However, in theory, the mark-up profit is quite different in many respects. The mark-up is for the services provided by the financial institution, namely, seeking out, locating and purchasing the required goods at the best price. Furthermore, the mark-up is not related to time since, if the client fails to pay a deferred payment on time, the mark-up does not increase due to delay and remains as pre-agreed. Most importantly, the financial institution owns the goods between the two sales and hence assumes both the title and the risk of the purchased goods, pending their resale to the client.

B. Mudaraba (Trust Financing)

Mudaraba is a form of partnership in which one partner provides the capital required for funding a project (the capital provider), while the other party manages the investment using his/her expertise (known as Mudarib). Profits arising from the investment are distributed according to a fixed, pre-determined ratio. Management of the investment is the sole responsibility of the Mudarib, and all assets acquired by him/her are the sole possession of the financier. The loss in a Mudaraba contract is borne by the capital-provider unless it was due to the negligence, misconduct or violation of the conditions pre-agreed upon by the Mudarib. This contract requires a great deal of confidence between the two parties and that is why it is very rarely used worldwide. Despite the determination of a form of restricted Mudaraba, as one means of finance for small enterprises, having been made by the Bank of Sudan, it is not frequently used in Sudanese banks particularly for financing small-scale enterprises (Ahmed, 2008).

C. Musharaka (Partnership Financing/Profit and Loss Sharing)

The Musharaka contract is very similar to the Mudaraba contract, but is different in that all parties involved in a certain partnership provide capital towards financing of the investment. Profits are shared between partners on a pre-agreed ratio, but losses will be shared in proportion to capital shares invested by each party. This gives an incentive to invest wisely and take an active interest in the investment. Moreover, in Musharaka, all partners are entitled to participate in the management of the investment, but are not necessarily required to do so. In the Islamic principle of Musharaka mode of financing, loans are granted without an obligation on the part of the partner to pay back whether he/she gains or incurs losss (Badr El Din, 2003). If the operation ends in a loss, the partner does not bear this loss alone. This contract does not require the partner to present securities against possible losses (Awad, 1994).

3.4. Summary

Some nongovernmental organizations, social funds and rural development projects have continued to be providers of micro-loans for the poor in Sudan since the 1980s but their outreach has remained minimal. Following the introduction of microfinance in the commercial banks in the mid of 1990s, the CBS launched a number of microfinance strategies and policies aiming at the provision of financial services to the economically active poor, especially in rural areas. However, banks' outreach was limited due to the fact that they were hesitant to engage in microfinance for many reasons some of which are the high transaction costs and the perceived high risk of default associated with low-income microfinance customers. Following the establishment of the MFU and the launching of Sudan Microfinance Strategy by the CBS in 2007, the overall situation of microfinance market in Sudan started to change, but very slowly.

The Islamic financing system has been introduced in all financial institutions in Sudan since the early 1980s. One of the teachings of Islam is prohibition of interest collection as the Islamic law (Sharia) considers money as a medium of exchange and store of value but not a commodity for exchange.

The most commonly used modes of finance for microcredit lending world wide are Murabaha, Musharaks and Mudaraba contracts. These contracts differ in terms of risk for both lenders and borrowers. However, the most commonly Islamic contract used for formal microcredit lending in Sudan is Murabaha because it is easy and simple to adopt.

CHAPTER FOUR

APPROACH AND METHODS OF THE STUDY AND DATA COLLECTION

4.1. Introduction

The following section presents the conceptual framework within which demand for and supply of formal microcredit to MSEs in Sudan and current supply-demand gap will be analysed and measured. Section 4.3 discusses the empirical approach employed to model determinants of demand for and supply of micro-credit to MSEs in the case study area. Sources and methods of data collection are then presented in Section 4.4 followed by a discussion of survey instruments in Section 4.5 and a chapter summary in Section 4.6.

4.2. Conceptual framework of formal microcredit to MSEs in Sudan

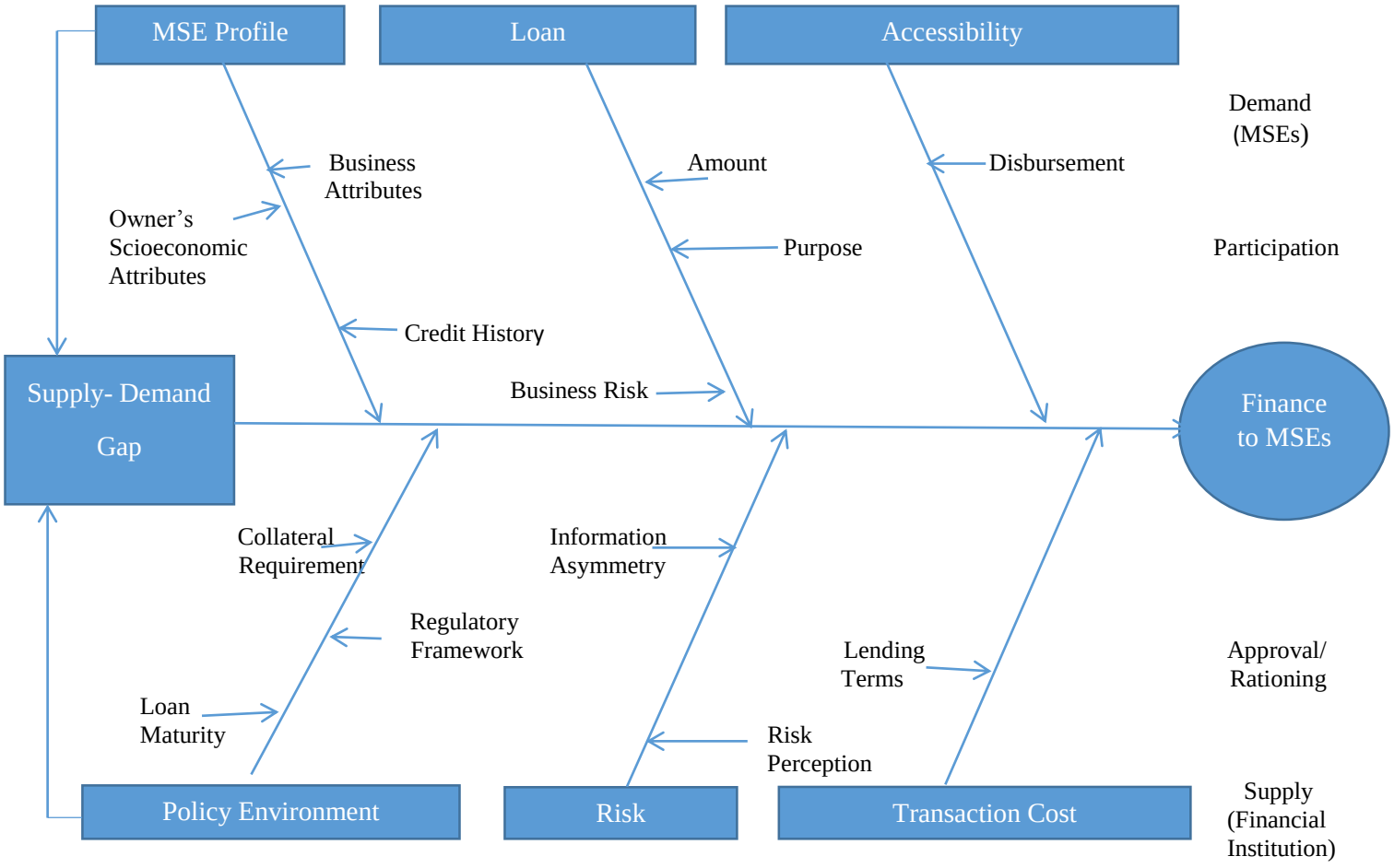
The conceptual framework presented in this section has been adapted from a directly relevant study by Ramlee' and Berma (2013) to clarify the way in which participation (demand for) and approval (supply) of loans interact in the microcredit market (Figure 4).

As mentioned earlier by studies in Sudan, demand for finance among MSEs in Sudan is strong, but lack of collateral and credit history seriously constrains their access. Formal financial institutions such as commercial banks refrain from providing services to low-income clients due to high transaction costs, uncertainty and information asymmetry. This raises the issue of financing gap that is often cited as detrimental to the growth of MSEs. The financing gap hypothesis suggests that small-scale enterprises suffer from a shortage of finance the likely cause of which is information asymmetry. Moreover, most of the studies on MSE bank and non-bank financing cited lack of access to finance as shaping the MSE supply-demand gap in the country. This study extends the above framework to analyze and measure influences of key factors on both demand for and supply of formal financing to MSEs as well as examining the extent and magnitude of the perceived gap.

Compared to large firms, MSEs in Sudan face a relative disadvantage to raise finance from formal institutions such as banks. This is due to factors, among others, such as information asymmetry, absence of collateral, poor accounting records and the risk that arise due to the specific markets that MSEs owners run their business in. In the eyes of formal lenders, MSEs are perceived as riskier than large firms due to their insufficient profit margins to repay loans as well as the higher transaction costs associated with small loans. Some studies also argue that MSEs are not qualified enough to participate in formal credit institutions or are often unable to pay profit (interest) charged by banks. This entails government intervention through a legal regulatory framework to ensure MSEs participation in formal microcredit markets.

On the supply side, a number of constraints encumber the flow of formal microcredit to MSEs sector. These include, and not limited to, transaction costs and information asymmetry. First, the costs that a financial institution incurs in processing small loan applications are high compared to large ones. This result in banks' inability to achieve profits and even if they do, the profit margins are lower compared to those achieved by other formal institutions that do not undertake microcredit operations to MSEs.

Figure 1. The conceptual framework of MSEs financing by formal microcredit institutions in Sudan



Source: Adapted from Ramlee' and Berma (2013)

The second constraint is the market imperfection of lending to small-scale firms. Banks making loans are concerned not only about the interest (named profit in Islamic terms) they charge on the loan but also about the riskiness of the loan. Moreover, the interest rate a bank charges may itself affect the pool of loans provided by the bank, either by attracting high risk borrowers (moral hazard) or by adversely affecting the actions and incentives of borrowers (moral hazard). In a world with imperfect and costly information, the expected rate of return to the bank will increase less rapidly than the interest and beyond a point, may actually decrease (Stiglitz and Weiss, 1981).

This section has presented the conceptual background for the discussion on formal financing to MSEs in Sudan. The subsequent sections of the chapter present modelling of determinants of demand for and supply of microcredit and methods and sources of data collection.

4.3. Modelling determinants of demand for and supply of microcredit

As discussed in the literature review chapter, some studies investigated demand for microcredit based on behavioural assumptions from theory of the consumer for households who use microcredit for consumption or investment. However, this study will not cover consumers' (households') demand, as microcredit in Sudan mainly targets to support small-scale enterprises. The demand side for this model therefore represents demand for microcredit by small-scale business enterprises. If information is available on what inputs or factor services are financed from these loans, that will allow linking the demand component to theory of the firm and invoke its behavioural assumptions. The typical situation in empirical research on microcredit precludes this possibility as loans are usually used to finance many items including often non-production uses (e.g. paying for other expenses such as school fees, medical and other expenses) and usually no records are kept or revealed on how loans are allocated among factor inputs.

The demand component of the model will therefore be based on pragmatic analytical frameworks and approaches as common in the majority of studies on microcredit for small-scale enterprises reviewed earlier. Among the several models employed in the literature to analyse determinants of demand for microcredit, choice models (Logit, Probit) and truncated regression models (Tobit) stand out as the most common. Demand decisions considered in this study include the following:

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

This sequence of decisions have been modelled and analysed in many ways in the literature. This study will adopt combinations of such models. The two-step Heckman's selection model (Heckman, 1976) used by many researchers

of demand for microcredit (Okurut, 2006; Nguyen, 2007; Mpuga, 2004; Diagne & Zeller, 2001) will be adopted to analyse determinants of decisions 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. Determinants of above described demand decisions will be chosen based on findings of relevant literature and knowledge of study area circumstances on which factors are likely to have significant influences on MSEs' demand for microcredit.

As noted in the literature survey chapter, few studies used behavioural analytical frameworks to model supply of microcredit. This is mainly due to the fact that provision of microcredit is policy-driven rather than being determined by market forces. Accordingly the supply side component of this study will adopt the approach of Umoh's (2006) study of credit supply. This approach is conceptually based on the pioneering work of Stiglitz and Weiss (1981) on credit rationing which points out that interest rates charged by a credit institution play a dual role of selecting potential borrowers (adverse selection) and affecting borrowers behaviour (incentive effect). According to this approach, financial institutions employ interest rates as a screening device. On the other hand, the incentive effect occurs because as interest rates and other terms of the contract change, the behaviour of borrowers is likely to change since it affects the returns to their projects. As the financial institution is unable to control all actions of borrowers due to imperfect and costly information, it will formulate the terms of a loan contract to induce borrowers to take actions in favour of the financial institution and to attract low risk borrowers. The loan size, maturity, terms of repayment, cost-to-serve, collateral and other terms of the contract also affect behaviour of borrowers as well as returns to the financial institution and hence lead to credit rationing.

Credit rationing occurs when potential borrowers' application for loans from formal credit sources are either denied or partially supported. This defines the gap between demand for and supply of credit. Information on size of the

loan applied for and actual credit received will be used to estimate the credit gap. Other measures of the credit gap that will be derived include percentage of unsatisfied demand for microcredit (in total or partial). These will allow testing the first hypothesis about existence and extent of the credit gap. The actual amount of credit made available by lending institutions will therefore measure credit supply in this study. As this measure will include zero values for those borrowers whose applications are rejected, this response variable will follow a truncated distribution. Heckman's two step selection model is also employed to analyze supply decisions (to approve a loan or not and how much to approve).

Factors that influence the decision to provide credit will include borrower, business and lender-related characteristics (socioeconomic attributes of owners and business attributes of borrowing MSEs including cost to client as well as lenders' policy and selection criteria and loan conditions including cost-to-serve factors). Empirical demand and supply models specified and variables included in the analyses are discussed in more detail in relevant chapters.

4.4. Sources and methods of data collection

To perform the intended analyses, this study collected information from two sources: secondary documentary sources especially from providers of formal microcredit and primary data from surveys of both borrowers and suppliers of microcredit. The following sections describe the methods employed to collect data used in subsequent analyses. Methods of collecting data from primary sources are detailed first. The second section documents sources and types of secondary information compiled to support the empirical analyses.

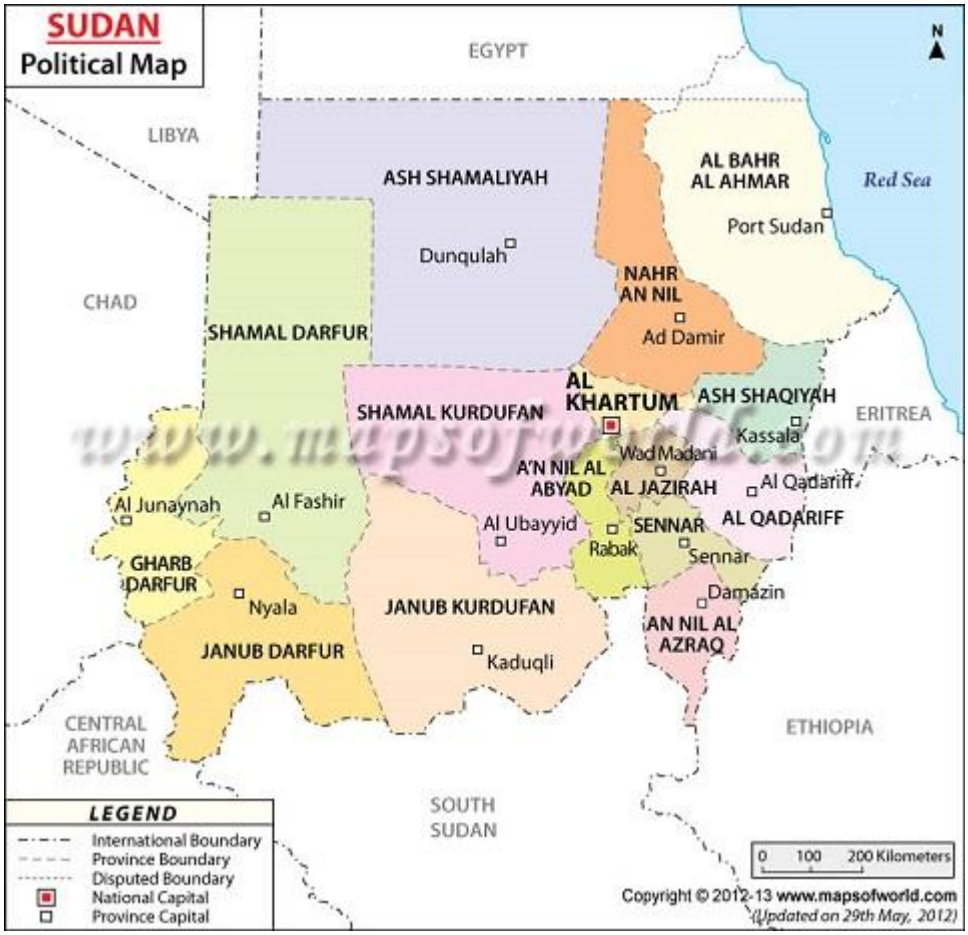
4.4.1. Primary data sources and survey methods

4.4.1.1. Study area and the target populations

The study was conducted in the urban and rural areas of Khartoum state, in Sudan, which lies between latitude 15-16N and longitude 21-24E with a total area of 22,122km^2 and a population size estimated at 5,274,321(Sudan

Central Bureau of Statistics, 2008/09). The Khartoum State comprises of three main areas: Khartoum, Omdurman and Khartoum North and is administratively divided into seven localities (appendix 1, figures 2 & 3). Khartoum State was selected as the case study because that is where microcredit markets and the bulk of MSEs concentrate. There are 42 banks currently operating 517 branches countrywide and more than 50 percent of these branches (61%) 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 (CBS, 2013).

Figure 2. Sudan political map with regional states and neigbouring countries

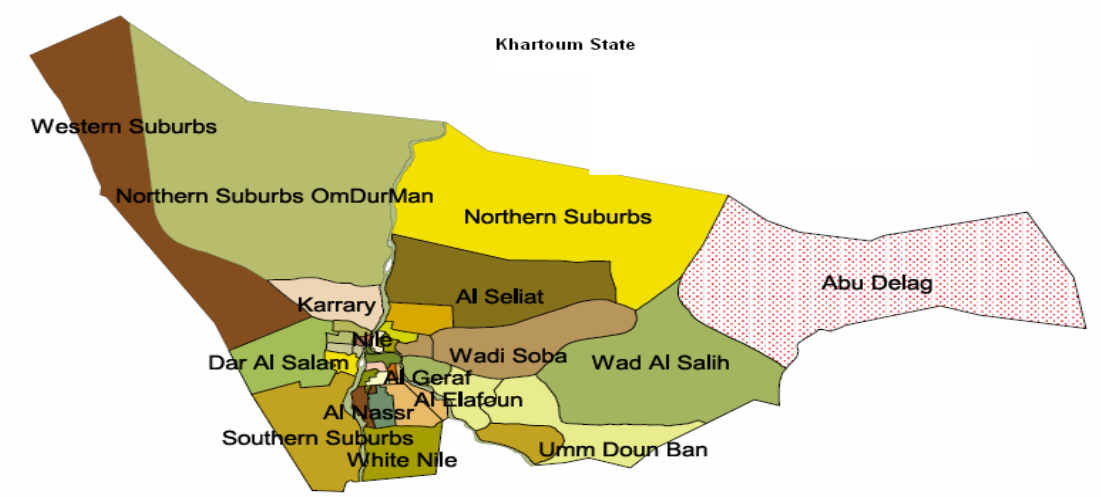


Source: Google maps

The target population of the study covers potential demanders of microcredit in Khartoum State who are primarily operating trade, production

(manufacturing), services and farming activities. Primary and secondary information were also collected from surveys of all formal banking institutions that provide microcredit services in Khartoum state. The study focused on the Murabaha Islamic contract, which is the most commonly used mode of microfinance by all commercial banks in Sudan and constitutes 97 percent of banks' total lending size (UNICONS, 2006a; Abukasawi, 2011).

Figure 3. Distribution of localities and their administrative sub-units in the Khartoum State (Source: Google maps)



As said above two surveys were conducted to collect the data needed for the intended analyses covering demanders and providers of microcredit in the study area. First, a survey of MSEs in the study area has been carried out. Multi-stage stratified random sampling was employed to select the sample from the target population of MSEs which was stratified by attributes considered of high relevance to key determining microcredit demand and supply factors. Location of the business was one key access and proximity factor. The population was accordingly stratified by location to represent MSEs operating in the three main areas of the state (Khartoum, Oumdurman, Khartoum North). Localities within each area (block) were then stratified in rural and urban groups to select sub-sample from each in stage two. In the third stage, each sub-group was further stratified by type of business (trade,

services, etc.) being another key determinant of demand for microcredit. MSEs within each location-business type substrata were further divided by size of the business (micro and small).

To adequately represent these groups, a sub-sample was selected from each location-business type-size group. Variable sample fractions were used to allocate the total sample between these strata depending on availability of an appropriate, adequate and up-to-date sampling frame. Selection was then performed in stages. In stage one, a sample of MSE business centres in the survey localities was selected to represent rural and urban-based MSEs. In stage two, a sample of MSEs in the selected business centres was randomly selected using appropriate available sampling frames.

Primary and secondary survey data were also collected from formal sources of microcredit in Khartoum State. It is worth noting that due to the limited number of formal microcredit institutions operating in Khartoum state (a total of 23 financial institutions, mainly banks providing microcredit); data needed for supply side analyses were obtained from all institutions via self-administered instruments from which two banks have been excluded because they failed to provide the data needed for the analysis.

4.4.1.2. Calculation of the sample size

The sample size refers to the number of MSEs to be included in the survey. The following presents steps of sample size calculation followed in this study:

Step 1: Base of sample-size calculation

The appropriate sample size for a population-based survey is determined largely by three factors: (i) the estimated prevalence of the variable of interest – awareness in this instance, (ii) the desired level of confidence and (iii) the acceptable margin of error.

For a survey design based on a simple random sample, the sample size required can be calculated according to the following formula(Cochran, 1976):

$$n = \frac{Z^2_{\alpha/2}}{\varepsilon^2} P(1-P) \qquad (4.5)$$

where

n = required sample size.

Z = confidence level at 95% (standard value of 1.96).

P = estimated level of awareness in the project area.

ε = margin of error at 5% (standard value of 0.05).

This yields a simple random sample of size:

$$n = \frac{2^2}{0.05^2} * 0.5 * 0.5 = 400$$

Step 2: Design effect

The MSE survey is designed as a cluster sample (a representative selection of residential areas), not a simple random sample. To correct for the difference in design, the sample size is multiplied by the design effect.

Now, since stratified multistage sampling used has a design effect (deff) which exceeds unity for the current design, then to obtain a suitable size for stratified multistage sampling the formula above should be multiplied by an appropriate deff (Kish,1965).

The design effect is generally assumed to be 1.5 for such surveys using cluster-sampling methodology.(Faris *et al.*, 2013)

$$n = \frac{Z^2_{\alpha/2}}{\varepsilon^2} P(1-P) * deff = 600$$

Step 3: Nonresponse

In such surveys it is expected that some of the 600 MSEs to be included in the sample will not respond. It is common practice to cater for such expected nonresponse by suitably inflating the sample size calculated solely on statistical grounds. The nonresponse inflation factor is usually estimated either from previous surveys of similar nature or from a pilot survey. As for this research a pilot survey was conducted for fine-tuning of the survey instruments where a nonresponse rate of 15% was encountered. As a consequence, the sample size given above was inflated by a nonresponse inflation index of 1.15, thereby leading to a final sample of 690.

The ultimate sample size is obtainable by using the following formula:

$$n = \frac{Z^2_{\alpha/2}}{\varepsilon^2} P(1-P) * deff * nonresponse\ inflation \qquad (3.6)$$

$$n = \frac{2^2}{0.05^2} * 0.5 * 0.5 * 1.5 * 1.15 = 690$$

This sample size was proportionately allocated to the above 12 strata as described below.

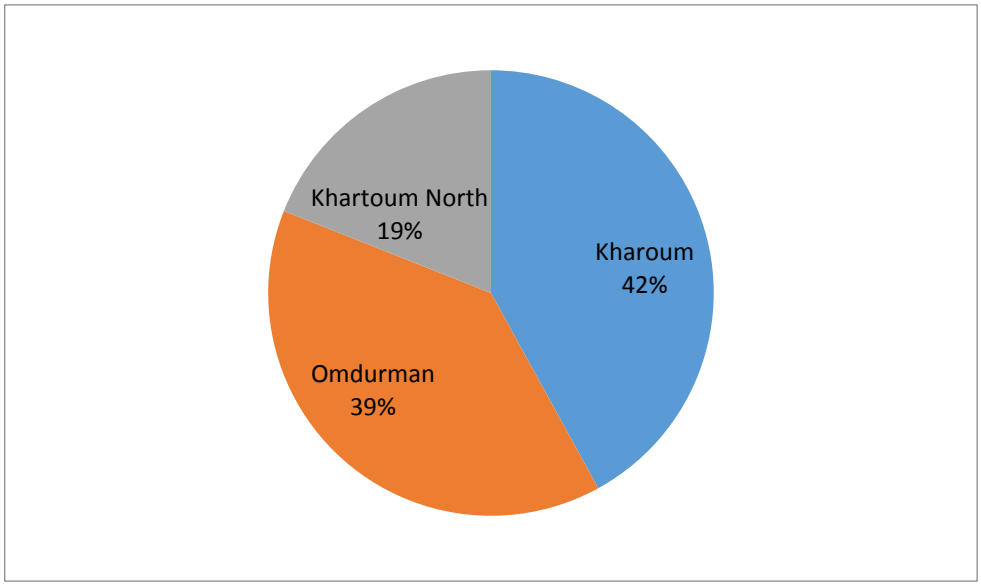
For sample allocation purposes and to avoid sample representation bias, sampling fractions have been allocated in proportion to densities of the population of MSEs in each sub-stratum (appendix 1). Weight factors for each sub-stratum were computed by dividing the number of MSEs in each sub-stratum by the total number of population of MSEs in Khartoum State (Appendix 2). Weight factors (sampling fractions) in each cell were then multiplied by the total sample size to calculate the size of the sample to be selected from each sub-stratum (Appendix 3). Due to the limited budget available for the survey, MSEs in sub-strata that have few MSEs (three and less) were added to other neighbouring strata in order to reduce cost of the spatial spread of the survey taking into consideration the geographical distribution, business size and type of activity (Appendices 3 and 4). This left no representation of farming activities in our data (Appendix 4).

As table 4.1 and figure 4 show, a total sample of 690 MSEs were allocated among the three areas of Khartoum State as follows: 42% from Khartoum, 39% from Omdurman and 19% from Khartoum North. The subsample from rural areas formed only 3% of the total number of respondents and they were selected from Khartoum and Khartoum North areas. The sample was distributed among three different types of business activities with the biggest share from the trade sector (73.2%) and lowest share from the production sector (8.4%). The small enterprises formed 58% whereas the micro enterprises formed only 42% of the total sample size.

Table 4.1. Sample size and distribution of enterprises by strata

Living mode/ Size of enterprise / Region/ Business type		Rural			Urban			Total
		Small	Micro	Total	Small	Micro	Total	
Omdurman	Trade	0	00	00	128	048	176	176
	Production	0	00	00	014	008	022	022
	Services	0	00	00	022	046	068	068
	Total	0	00	00 0.0%	164	102	266 39.8%	266(100) 39%
Khartoum North	Trade	5	05	10	049	026	075	085
	Production	0	06	06	004	008	012	018
	Services	0	00	00	013	016	029	029
	Total	5	11	16(12.1) 76.2%	066	050	116 17.3%	132(100) 19%
Khartoum	Trade	0	05	05	147	092	239	244
	Production	0	00	00	012	006	018	018
	Services	0	00	00	007	023	030	030
	Total	0	05	05 23.8%	166	121	287 42.9%	292(100) 42%
TOTAL	Trade	0	00	00	128	048	176	176
	Production	0	06	06	030	022	52	58
	Services	0	00	00	042	085	127	127
	Total	5	16	21(3.0) 100%	396	273	669(97) 100%	690(100) 100%

Figure 4. Distribution of MSEs in the three areas of Khartoum State



Source: (Survey data, 2013)

4.5. Survey instruments and data collected on variables of the analyses

Data from MSEs were collected using structured questionnaires. The questionnaires used for collecting data were first pretested in pilot surveys to check suitability of the questions included and measurement of units used, order of questions, estimate of length of the interview time and best time for planning survey visits, train enumerators, identify major sources of non-random errors and percentages of non-responsiveness. Based on results of the pilot surveys, the questionnaire content, wording and order of questions were revised and the main survey plans and schedules of field visits were developed and implemented by the enumerators through direct interviewing of selected respondents. Following the pilot survey, the enumerators received training for three days on how to locate (or select) their sample members using appropriate sampling frames and how to conduct interviews with them, how to ask questions and record answers as instructed and how to comply with the requirements necessary for conducting a successful interview. Prior to the field work, the enumerators were provided with letters of permission issued by the local authorities to allow them to conduct the survey. The target population was determined as all micro and small enterprises (MSEs) are involved in production, manufacturing, services and farming activities in both urban and rural areas of Khartoum state. Sampling frame lists were

collected from the three localities of Khartoum state (Khartoum, Oumdurman and Khartoum North). Some lists were obtained from headquarters of the localities and some others were obtained directly from the administrative units and sections. The sampling frame lists contained classification of enterprises according to the type of activity (production, manufacturing, services and on-farm), business size (macro/small) and location (rural/urban).

The survey of MSEs owners was conducted during June and July of 2013 by fifteen enumerators distributed as a team of 5 enumerators for each of the three areas with a supervisor from within for each team responsible for his team guidance and follow-up and collection of completed questionnaires. The average time to complete a questionnaire was 35 minutes. There were 37 incomplete questionnaires either because some respondents failed to provide the information needed or some enumerators did not fill in some answers. These incomplete questionnaires were replaced by interviewing additional respondents from a reserve list to achieve 100% response of the intended total sample of 690.

The survey of banks was carried out during the period of November 2012/ May 2013 by the researcher. The survey covered all 23 banks providing microcredit services in Khartoum state. However, two banks were excluded from the analysis because they failed to provide adequate data needed for analyses due to lack of regular records. A pilot survey was conducted in the said banks to check suitability of the questions included, measurement of units used, order of the questions and to identify the major sources of non-random errors. The questionnaires were filled in by officials at the different sections specialized in microcredit within the said banks.

Secondary data were also collected from the banks mentioned above as well as the Microfinance Unit (MU) of the CBS on microcredit policies, size of portfolios implemented, staff training programs and number and location of the bank branches providing microcredit in Khartoum State.

4.6. Summary

The current study is based on data collected from two sources: secondary documentary sources from formal financial institutions providing microcredit services in Khartoum State and primary data from both MSEs owners and suppliers of microcredit using structured questionnaires. The MSEs primary data were collected from a cross-section survey of MSEs business holders in Khartoum State, Sudan during the period from June/July 2013. This survey covered a total of 690 MSEs to compile the data needed for studying demand for and supply of 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. The primary and secondary data from financial institutions were collected from 21 banks providing microcredit in the three areas of the Khartoum State during the period from November 2012/ July 2013.

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 contain 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.) as well as lender-related attributes such as collateral requirement. The primary data from the two sources were collected using structured questionnaires administered through direct interviews with the selected respondents.

The demand component of the study is based on pragmatic analytical frameworks and approaches as common in the majority of studies on microcredit for small-scale enterprises. The supply side of the study adopted the approach of Umoh's (2006) study of credit supply which is conceptually based on the primary work of Stiglitz and Weiss (1981) on credit rationing. Heckman's sample selection model is employed in the study to analyse determinants of demand for and supply of microcredit. Demand response

variables were measured by whether a potential borrower has applied for credit and the amount applied for. Information collected on supply response variables covered whether the loan application has been approved by formal microcredit providers and the amount of microcredit approved.

Chapter five presents and discusses factors that determine the small-scale business owners' participation and intensity of participation in formal microcredit markets in Sudan.

CHAPTER FIVE

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

5.1. Introduction

This chapter analyses the effect of individual, business, and lender-related factors on the decision to participate and level of participation in formal microcredit using firm-level data collected from a survey of MSEs in Khartoum state, Sudan. The Heckman two-stage selection analytical model is employed to implement the intended analysis of determinants of demand for formal microcredit among MSEs in the study area. As discussed earlier, Khartoum State has been chosen as the case study area as it is currently the focal area and centre of microcredit activities. The following section develops the empirical model and defines variables used in the analysis. Section 5.3 presents results of the empirical estimation and Section 5.4 concludes providing some policy implications and recommendations.

5.2. Specification of the empirical model and variables used in the demand analyses

A two-stage process will is employed to analyse determinants of demand for microcredit. Stage one selects who participates and who does not and hence included in the second stage is a sub-sample of the first selection stage. 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 (Heckman, 1976) assumes that there exists an underlying relationship which consists of the latent equation given by:

$$y_j^* = x_j\beta + \mu_j \qquad (5.1)$$

Where y_j^* is the latent choice variable (participate or not), x is a vector of explanatory variables hypothesized to affect participation, β is the vector of model parameters to be estimated and μ_j is the independently distributed error term with mean zero and variance σ^2. The first stage estimation of the Heckman two-step Probit procedure involves only the binary observed outcome (participate or not) specified as:

$$y = x\delta + \varepsilon \text{ if } y_j^* > 0 \qquad (5.2)$$

$$y = 0 \quad \text{otherwise (i.e. } y_j^* \leq 0)$$

The dependent variable y_j^* is observed only if event j is observed, δ is the vector of parameters to be estimated and ε is the residual error term. Equation 3.2 represents a Probit model specification when the outcome is limited to the zero/one range, i.e. applied ($y_j^* = 1$) or not ($y_j^* = 0$).

After deciding to participate (apply for credit) borrowers then respectively, choose how much credit they need (size of the loan). In such case the response variable follows 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 ($y_j^* \succ 0$). The probability that the outcome of stage two will be zero in the Tobit model can be specified as (Greene, 2000):

$$P(y_i = 0) = \phi(-\frac{\beta' x_i}{\sigma}) \qquad (5.3)$$

And the density function for the positive values of y_i is:

$$f(y_i / y_i > 0) = \frac{f(y_i)}{P(y_i > 0)} = \frac{\frac{1}{\sigma}\phi(\frac{y_1 - \beta' x_i}{\sigma})}{\phi(\frac{\beta x_i}{\sigma})} \qquad (5.4)$$

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).

When the error terms from the selection and the outcome equations (first and second stages) are correlated, standard Probit techniques applied to equation (5.2) could yield inefficient estimation results. Thus, the Heckman two-step procedure, e.g. Probit in stage 1 and Tobit in stage 2 provides consistent and asymptotically efficient estimates for all parameters in such models (Van de Ven & Van Praag 1981).

The above two-step Heckman selection analytical framework is used to implement the empirical analysis of determinants of demand for (participation) in microcredit among MSEs' owners as specified below:

$$P_i = \delta Z_i + \varepsilon_i \qquad E(\varepsilon_i / z) = 0 \tag{5.5}$$

The above specification defines a 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 or not), Z_i is a vector of variables that influence the participation decision, δ estimates model parameters, and ε_i is the error term.

Step 2 of the Heckman selection model is implemented by estimation of the following outcome equation explaining intensity of participation:

$$Y_i = \beta X_i + \mu_i \quad E(\mu_i / X) = 0 \tag{5.6}$$

Where Y_i indicates intensity of participation measured by the amount of credit applied for, X_i is a vector of explanatory variables, β is the vector of parameter estimates and μ_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 ε_i and μ_i is not zero, it brings about the selection bias problem and invalidity of Ordinary Least Squares (OLS) Estimation. After estimating the selection equation (5.5) a non-selection bias is computed using equation 5.7 below:

$$E(\varepsilon_i / P_i, Z_i) \tag{5.7}$$

This is the Inverse Mills Ratio (IMR) $\lambda(\delta Z_i)$ when $P_i = 1$. The new λ is used in the selection equation (5.6) as an explanatory variable. The model for the second stage regression then becomes (Greene, 2000):

$$E(Y_i = Z_i, P_i = 1) = \beta X_i \rho\lambda(\delta Z_i) \tag{5.8}$$

Equation (5.8) 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.

Demand responses were measured by whether a potential borrower has applied for microcredit or not and the amount applied for. As discussed earlier, studies in the relevant literature identified various individual, business 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 and Murabaha contract. Information on a similar set of explanatory variables have been collected from the survey and included in the analyses as described in Table 5.1 below.

5.3. Results and discussion of the empirical estimation

Results of the Heckman two-step estimation of the influences of individual, business and lender attributes on the probability and level of participation of MSEs in microcredit are reported and discussed in the following sections. 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 reported in Tables 5.2 and 5.3 below to facilitate direct interpretation and discussion of the results.

Table 5.1. Variables included and summary statistics

Variable	Description	Mean	Min	Max
Age	Age of respondent in years	1.22	0	3
Marital status	Dummy of value 1 if respondent is married and 0 if otherwise	0.80	0	1
Gender	Dummy of value 1 if a respondent is male and 0 if female	0.81	0	1
Other member of family has income	Dummy of value 1 if other member of family has income and 0 if other wise	0.57	0	1
Household income	Total amount of family income measured in Sudanese pounds [a]	12443.48	15000	27500 [a]
Extra household income	Dummy of value 1 if respondent has extra source of income and 0 if otherwise	0.81	0	1
Duration in business	Number of months in business	9.96	7	39
Training	Dummy of value 1 if respondent has received training and 0 if he has not	0.20	0	1
Business size	Dummy of value 1 if size of the business is small and 0 if micro	0.58	0	1
Accounting records	Dummy of value 1 if respondent maintains accounting records and 0 if otherwise	0.34	0	1
Type of business activity	Dummy of 1 if type is trade and 0 if otherwise	0.73	0	1
Awareness of bank microcredit	Dummy of value 1 if respondent is aware of microcredit service and 0 otherwise	0.77	0	1
Awareness of Murabaha	Dummy of value 1 if respondent is aware of Murabaha and 0 if otherwise	0.66	0	1
Value of assets owned	Total value of business assets owned measured in Sudanese pounds	7728.99	1500	15000 [a]
Member of a social group	Dummy of value 1 if respondent is a member of a social group and 0 if otherwise	0.43	0	1
Working capital	Total amount of operating capital in Sudanese pounds	27150.80	150	500000 [a]
Dwelling	Dummy of value 1 if respondent lives in owned house and 0 if otherwise	0.49	0	1
Home of origin	Dummy of value 1 if respondent's home origin is Khartoum state and 0 if otherwise	0.27	0	1
Zone	Dummy of value 1 if respondent's business is located in Khartoum area and 0 if otherwise	0.42	0	1
Number of workers	Number of workers employed in the business	1.80	1	11
Cost-to-client	Total cost incurred by respondent to apply for microcredit measured in Sudanesee pounds[a]	211.54	5	610
Collateral	Dummy of value 1 if respondent doesn't have adequate collateral and 0 if otherwise	0.15	0	1
Complicated and long procedures	Dummy of value if respondent perceives credit to be long and complicated	0.20	0	1
Total number of observations		690		

a. At the time of the survey (2013) one US$ was equivalent to SDG 6 exchange rate.
b. Source: MSEs survey in the three areas of Khartoum state.

5.3.1. 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 Inflating Factor (VIF) of 1.16 which indicates no multicolinearity problems. As can be seen from Table 5.2, the marginal effects of many key explanatory variables were statistically significant. The signs on estimated parameters seem to be consistent with the expectations and 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 (Zeller 1994, Mpuga, 2004, Okurut, 2004, Messah & Wangi, 2011 and Duman, 2009). 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 sources) than women. We also note that female-owned micro firms form close to two thirds (62%) of the total sample size in this study suggesting females' keenness to expand their MSE businesses. This result is in line with the finding of a descriptive study in Sudan (UNICONS, 2006a) 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; Muhongayire *et al.*, 2013; Sekyi *et al.*, 2014; Magri, 2002).

The study confirmed the importance of awareness of the existence of formal microcredit services 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). 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 Oktin and Osili (2004), Kimuyu and Omiti (2000), and Quoc et al.(2012).

Table 5.2: Estimates of marginal effects of Heckman selection equation of determinants of MSEs owners' participation in formal microcredit in Khartoum state, Sudan

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 Employees	-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 procedures	-1.600	-5.20	0.000***
Social Group	0.230	1.66	0.097*
Zone	0.482	3.26	0.001***
Home Origin	0.401	2.74	0.006*
Constant	-2.133	-4.44	0.000***
Mills lambda	-1329.064	-0.88	0.380
Rho	-0.185		
Sigma	7196.848		
No. of observations	690	Wald chi2(11) 67.990	
Censored observations	525	Prob.>chi2 0.000	
Uncensored observations	165		

*****, **,* denote significance at 1%, 5% and 10% respectively**

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 the 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.

Results also indicate that as the number of employees increases by one unit, the probability of MSEs owners applying for microcredit decreases 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 (Pham & Lensink, 2007; Messah & Wangi, 2011; Umoh, 2006; Okurut, 2004; Atieno, 2001). 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. 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 close to two thirds (61%) 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.

The influence of cost-to-client attribute on decision to participate in formal microcredit was tested in the first run of the regression. Nevertheless, this variable did not perform well and was hence excluded from the second model test. Other variables such as level of education, type of activity, months in business and marital status have shown no statistical significance in influencing the decision to apply for microcredit which seems consistent with the result from Aga and Reilly (2011) and Messah and Wangi (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.

5.3.2. Factors affecting the level of participation in formal microcredit

Results of the Heckman outcome (stage two) Tobit estimation are reported in Table 5.3. The multicolinearity check for this model shows a Variance Inflating Factor (VIF) of 1.21 which indicates no multicolinearity 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 Murabha 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. This indicates 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 5.3. 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

households gain 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 the 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 the 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 records and age of business showed no statistically significant influences on intensity of participation in formal credit markets.

Table 5.3. Heckman outcome equation Tobit estimation results on factors influencing the level of participation in formal microcredit 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	-2399.116	-1.82	0.068*
Cons.	9213.852	3.02	0.002

*****, **,* denote significance at 1%, 5% and 10%, respectively.**

5.4. 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 such as awareness of Murabaha mode of finance and number of employees. 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 MSEs 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 MSEs 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 of the

existence of formal microcredit, 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 the 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 targets 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.).

5.5. Summary

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.

Chapter six presents the key factors influencing formal credit providers' decisions to supply and ration access to microcredit, the extent and distribution of the current supply-demand gap among various borrower groups and discussion of other attributes related to microcredit users in Sudan, namely cost-to-client and repayment performance among and between different borrower groups.

CHAPTER SIX

DETERMINANTS OF FORMAL MICROCREDIT SUPPLY TO SMALL-SCALE ENTERPRISES AND FINANCING GAP IN SUDAN

6.1. Introduction

This chapter investigates the question of how demand for microcredit by MSEs in Sudan is matched by supply particularly from formal credit providers and whether there is currently a financing gap problem. Previous studies have provided useful information about microcredit supply sectors in Sudan but have not addressed important issues for appropriate policy reforms and institutional interventions to rectify the situation. For instance, the studies conducted on microcredit in Sudan have not analyzed and measured the extent of influences of key factors on banks' decision to provide microcredit and the amount to be provided to MSEs. This chapter carries out an empirical investigation into determinants of microcredit supply by formal sources to MSEs in the country. Comprehensive analysis of influences of important individual, business and lender-related factors on lenders' decision to provide credit is pursued in the following sections. Existing analytical approaches and empirical models of relevance are adapted to analyze influences of key factors on both the decision to approve and intensity of approval (level of supply) of formal microcredit to MSEs' owners in Sudan.

The next section develops the empirical model and defines variables used in the analyses. Section 6.3 presents results of the empirical estimation and section 6.4 addresses the first research question of the study of whether there is a gap between demand for and supply of microcredit, how large that gap is and its distribution among and between the various borrower groups. Other important aspects of microcredit operations particularly cost to client and loan repayment performance of the various borrower groups are presented in Section 6.5. The analyses and discussions are based primarily on survey data collected from providers and users of microcredit (The MSEs Survey carried by the study) and where possible the study survey findings are compared to

available literature on these aspects. Section 6.6 provides some policy implications and recommendations and a summary of the chapter is given in section 6.7.

6.2. Empirical model specification, estimation procedure and variables used

The two-step Heckman selection analytical framework presented and described in Chapter five is employed to implement the intended empirical analyses of influences of key determinants of microcredit supply.

In step 1 we employ a probit model (equation 5.5) to estimate determinants of the probability of approval of microcredit by formal providers. In step 2 we estimate the outcome equation (5.6) explaining the level of approval (i.e. amount of loan approved):

A number of explanatory variables (i.e. individual-related, business-related and lender-related variables) have been identified in the relevant literature as key factors of approval and level of approval of microcredit for households and small-scale enterprise owners. As mentioned in chapter 4 the study collected secondary information from formal lenders, namely banks providing microcredit in Khartoum state. Information on supply factors included profit margins charged by the different providers of microcredit in the state but the margin of difference between them was negligible (see appendix 6) and hence this was not included as a determining factor in our analyses. None of the banks surveyed kept information records on transaction costs associated with microcredit operations and hence influence of cost-to-serve on decision to approve and level of approval is not included in our analyses. Information collected on bank requirements for approval of applications indicate that a feasibility study containing details of the intended investment such as initial capital, expected return, etc. as well as information about the applicant financial and business status, such as other sources of income, value of assets owned, household expenditure, etc. need to be provided for evaluating eligibility for lending.

A key requirement is collateral security which varies from a bank to another according to the nature of the bank and the loan in question. Collateral

requirements range from post-dated checks from both the applicant and his guarantor to pawning of assets. Banks, however, do not disclose such information about clients and hence the study had to rely in the analysis on information collected from the primary MSEs owners' survey of relevance to the collateral factor effects. Information on attributes such as ownership of dwelling, value of assets, profit from and expenditure on business, legal status, size and age of business, training on business, awareness of formal microcredit service, awareness of Murabaha contract and ability to provide collateral were tested as proxies to the collateral requirements effect. Other MSEs owners' attributes considered as explanatory variables included the age, gender, marital status, and educational level of the MSE operator, as well as family size, ethnic group, household income and expenditure, type of activity, and distance from nearest bank (Table 6.1).

Table 6.1. Variables included and summary statistics

Variable	Description	Mean	Min	Max
Age	Age of respondent in years	1.22	0	3
Marital status	Dummy of value 1 if respondent is married and 0 if otherwise	0.65	0	1
Gender	Dummy of value 1 if a respondent is male and 0 if female	0.81	0	1
Rural/urban	Dummy of value 1 if respondent's mode of living is urban and 0 if rural	0.03	0	1
Household expenditure	Total amount of family expenditure measured in Sudanese pounds [a]	10 959.97	1 500	27 500[a]
Extra household income	Dummy of value 1 if respondent has extra source of income and 0 if otherwise	0.19	0	1
Duration in business	Number of months in business	30.13	7	39
Training	Dummy of value 1 if respondent has received training and 0 if he has not	0.20	0	1
Business size	Dummy of value 1 if size of the business is small and 0 if micro	0.58	0	1
Accounting records	Dummy of value 1 if respondent maintains accounting records and 0 if otherwise	0.34	0	1
Type of business activity	Dummy of 1 if type is trade and 0 if otherwise	0.73	0	1
Annual business profit	Amount of annual profit from business measured in Sudanese pounds [a]	12 189.13	1 500	27 500[a]
Awareness of Murabaha contract	Dummy of value 1 if respondent is aware of Murabaha and 0 if otherwise	0.66	0	1
Value of assets owned	Total value of business assets owned measured in Sudanese pounds [a]	7 728.99	1 500	15 000[a]
Membership of a social group	Dummy of value 1 if respondent is a member of a social group and 0 if otherwise	0.43	0	1
Education	Respondent's level of education	3.70	0	7
Dwelling	Dummy of value 1 if respondent lives in owned house and 0 if otherwise	0.49	0	1
Home of origin	Dummy of value 1 if respondent's home origin is Khartoum state and 0 if otherwise	0.27	0	1
Zone	Dummy of value 1 if respondent's business is located in Khartoum area and 0 if otherwise	0.42	0	1
Number of workers	Number of workers employed in the business	1.80	1	11
Collateral	Dummy of value 1 if respondent believes he was able to provide collateral and 0 if otherwise	0.15	0	1
Legal status	Dummy of value 1 if business is registered and 0 otherwise	0.54	0	1
Total number of observations		690		

a. At the time of the survey (2013) one US$ was equivalent to SDG 6 exchange rate.
b. Source: MSEs survey in the three areas of Khartoum state.

6.3. Results and discussion of the empirical estimation

Parameter estimates of the Heckman two-step selection procedure were used (post estimation) to compute marginal effects of included determinants. This is because estimated coefficients have no direct interpretation as they are just values that maximize the likelihood function. On the other hand, marginal impacts have direct interpretations and hence facilitate better discussion of

the results. Estimation results and their implications for microfinance policy and practice in Sudan are presented in the following sections.

6.3.1. Factors influencing formal lenders' decision to provide microcredit

The Probit model employed for estimating parameters of determinants of microcredit approval in the first (selection) step performed very well with statistically significant error term statistics (Prob > chi2=0.0000). The model has been checked for multicolinearity with test results for a Variance Inflation Factor (VIF) of 1.19 indicating no multicolinearity problem. The marginal effects of many key explanatory variables were statistically significant as table 6.2 shows. The signs on estimated parameters seem to be consistent with expectations and the direction of effects found in the literature as discussed below.

One of the interesting results is the apparent bias of microcredit suppliers in favour of female-owned enterprises as the probability of women being approved for formal microcredit is 50% higher than men. This could possibly be due to the fact that banks consider women to be trustworthy as they fear default penalties more than men (i.e. more risk averse than men). Another possible explanation could perhaps be that banks target female-owned MSEs for empowerment purposes in order to enable them graduate to larger enterprises. This result is consistent with the findings of Zeller (1994) and Sebu (2013).

Awareness of the Murabaha mode of finance appears to have a highly significant positive influence on the approval of microcredit. This seems to suggest that those who are aware of this system are familiar with terms and conditions of loan approval and hence are able to meet formal bank requirements as well as repayment conditions. Related to this is the finding that the probability of MSEs owners who are members of social groups being approved for formal microcredit is 32% higher than those who are not. This may be because banks perceive social networks as information sharing facilitators by assisting the many MSEs owners to have better understanding of procedures and rules of formal lending. It may also be because information

networks act as a screening mechanism where potential clients are asked to be recommended or guaranteed by existing clients, thereby acting as social collateral. This result is consistent with findings from Quoc *et al.* (2012) and Vaessen (2000).

One key business related attribute is training, the effect of which was found to be positive as study results suggest that the probability of approval of microcredit among MSEs owners who received training on business is 43% higher than among those who did not. This seems to imply that banks have a positive perception of those who received training and consider them possessing the necessary knowledge to run viable income generating businesses as well as manage business risk and hence become able to provide adequate collateral as well as meet banking repayment conditions. As shown in appendix 8, the majority of those who paid back (92.31%) received training. This result confirms findings from Tonin *et al.* (1998) and Alhassan and Sakara (2014). Another business related factor investigated is the correlation between record keeping and approval. The study found that the probability of microcredit approval among those who maintain accounting records is 36% higher than among those who don't. This clearly indicates that formal lenders are more inclined to provide credit to applicants with better business knowledge and managerial skills who adopt technologies that enable them to generate more income and hence become more capable of securing collateral as well as timely repayment. As reported in appendix 8, the majority of those who did keep accounting records paid back. This is in line with results from Okurut *et al.* (2004), Aga and Reilly (2011), Mira and Kennedy (2013), Avortri *et al.* (2013), Nangaki *et al.* (2014) and Eije *et al.* (2002).

Table 6.2. Estimates of marginal effects of Heckman selection equation (Probit model) of determinants of approval of formal microcredit to MSEs owners in Khartoum state, Sudan

Variable	Coefficient	Z	P>[z]
Age	0.006	0.04	0.968
Gender	-0.500	-3.03	0.002***
Dwelling	0.276	1.97	0.048**
Family expenditure	-0.000	-2.92	0.004***
Aware of Murabaha	0.726	4.79	0.000*
Number of employees	-0.034	-0.68	0.496
Business records	0.361	2.47	0.014**
Training	0.432	2.85	0.004***
Collateral	2.062	4.76	0.000*
Extra income	0.422	2.81	0.005***
Social group	0.321	2.44	0.015**
Zone	0.486	3.56	0.000*
Education	-0.036	-0.95	0.344
Rural/urban	-0.279	-0.61	0.539
Business profit	-9.630	-1.11	0.265
Value of assets	0.000	1.78	0.076*
Marital status	-0.030	-0.21	0.832
Duration in business	-0.044	-1.24	0.216
Legal status	0.081	0.54	0.586
Type of activity	0.121	0.81	0.416
Home origin	0.295	2.05	0.041**
Cons	-3.203	-6.03	0.000
Mills lambda	2512.012	1.30	0.194
Rho	0.414		
Sigma	6060.783		
No of observations	687	Wal chi2(11) 40.64	
Censored observations	524	Prob.>chi2 0.00	
Uncensored observations	163		

*****, **,* denote significance at 1%, 5% and 10% respectively**

Results also showed home of origin to be a factor of significance in successful application for loans from formal providers of microcredit. The probability of MSEs owners whose home origin is Khartoum state being approved for formal microcredit is 29% higher than the probability of those coming from other parts of the country. This may be due to the highest repayment rate reported in the survey among those from Khartoum (48%) compared to those from other areas (see appendix 8). Another factor could be the fact that those from within Khartoum state have better access and personal knowledge of bank staff who are mostly from Khartoum also suggesting stronger social networks with the banking sector.

Related to this is the location of business (Zone) which was found to be a significant factor in credit approval as the study revealed that the probability

of those whose businesses are located in Khartoum area approved for microcredit from formal sources is 48.6% higher than those whose businesses are located elsewhere within the state. Moreover, MSEs operating in Khartoum area form the highest percentage (42%) compared to the other two areas (Omdurman 39% and Khartoum North 19%) and bank branches in Khartoum represent close to two thirds (61%) of the total number of branches providing microcredit in the state (appendix 7). This concurs with results from Okurut (2006) who found provincial location to have a positive and significant effect on access to formal credit.

Having extra income from sources other than the main MSE in question (e.g. wages from another job, money transfers from relatives, pension, charity, etc.) appears to have a significant positive effect on approval. Results indicate the probability that MSEs owners who have other sources of income are more likely to be approved for formal microcredit is 42% higher than for those who don't. This indicates that having other sources of income increases the chance of acquiring formal loans. It may imply that with additional and diverse sources of income banks view an MSE owner to be more capable of repaying dues and this is supported by the summary result that almost all those who did have extra income (96.15%) repaid their loans (see appendix 8). This finding is consistent with results from Vaessen (2000), Davis *et al.* (1998) and Awunyo-Victor *et al.* (2014). Related to having extra source of income is the amount of family expenditure which was found to have a statistically significant negative effect on approval. This implies that formal lenders view applicants with high level of expenditure as having limited resources to save and hence less ability to repay. This result concurs with finding from Okurut and Schoobee (2007) who found a significant positive effect of household expenditure on credit rationing in Uganda. They however, considered this to be unexpected since household expenditure is argued to be a measure of wealth and high repayment ability.

As expected, ability to provide collateral was found to have a highly significant positive influence on the success in acquiring microcredit. Consistent with the literature, this implies that MSE owners who can afford to provide collateral are more likely to be approved for microcredit

indicating that the availability of collateral is a key requirement in formal credit markets. This finding is widely held in the literature, as collateral both reduces default risk (for incentive reasons) and lender exposure to loss in the event of repayment default (Zander, 1992; Fatoki & Smit, 2011; Tadesse, 2014; Dutta & Magableh, 2006; Pham & Lensink, 2007; Essien & Arene, 2014; Mira & Kennedy, 2013). Another factor closely linked to the collateral requirement is the value of assets owned which was found to be of high significant influence indicating that as the value of assets of the MSE owner increases the probability of credit approval also increases. This may imply that formal lenders look at wealthier MSEs owners more favourably compared to the less wealthy and concurs with results from Zeller (1994), Okurut *et al*. (2004), Quoc *et al*. (2012) and Dutta and Magableh (2006). Also related to collateral requirement is the ownership of a dwelling which was found to have a significant positive influence implying that MSEs operators who live in their own houses are 27.6% more likely to be approved for credit than those who live in rented houses, shanty houses, at workplace or with family and friends. It is expected that formal lenders are more inclined to favour disbursement of credit to those who own their place of residence as their property can be used as collateral as well as a sign of the applicant's stability to repay dues. Appendix 8 shows that more than two thirds (70.87%) of those who repaid their loans did have dwelling. They may also be perceived, with their address known to the lender, to be lower risk clients with lower cost of legal enforcement in the event of default. This finding concurs with results from Blumberg and Letterie (2008).

Other variables such as level of education, type of activity, duration in business, marital status, mode of living (rural/urban), business profit, legal status and age of applicant have shown no statistical significance in influencing the decision to approve microcredit, which seems to be consistent with results from Doan *et al.* (2010), Davis *et al.* (1998) and Magri (2007) and most likely an indication that they proxy the influences of the relatively more significant factors discussed above.

The coefficient of the Inverse Mill's Ratio (IMR) in the selection equation was positive but insignificant at 0.194 indicating no sample selection bias in this case.

6.3.2. Factors influencing level of approval of microcredit

Results of the Heckman outcome (stage two) Tobit estimation are shown in Table 3. The multicolinearity check for this model shows a Variance Inflation Factor (VIF) of 1.15 indicating no multicolinearity problem in the model. While household attributes did not seem to have statistically significant influences, a number of key business-related characteristics appear to significantly affect levels of approval of formal microcredit measured as the amount of microcredit provided (in Sudanese pounds) to an MSE owner.

Having extra income from sources other than the main MSE in question (e.g. wages from another job, family transfers, pension, charity, etc.) appears to have a significant positive effect on the level of microcredit approval. This may imply that formal lenders perceive applicants who have additional and diverse sources of income as more able to repay larger amounts of credit after meeting household expenditure than those who don't. Related to income from other sources is the value of assets owned which was found to be positive and significant. A one pound increase in the value of assets owned increases the amount of loan approved by SDG 0.19. This indicates that banks perceive applicants with higher value of assets to be more creditworthy than those with lower value of assets being more capable of repaying larger amounts of credit. This finding concurs with results from Mpuga (2004).

Study results also seem to suggest that as the business size increases, the loan amount approved also 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 banks may consider approving larger amounts for larger enterprises to enable them meet their larger capital needs. Close to two thirds (62%) of those who repaid were small business operators (see appendix 8). This result concurs with finding from Laha (2014).

The study found that the amount of loan approved for those who maintain accounting records is SDG 2,945 higher than for those who don't. This may be because banks expect those with accounting knowledge to have better business managerial and financial skills among MSEs that give them an advantage over those with no financial records when they are approved for larger levels of microcredit. This result is in line with Njeri (2012) findings.

Other variables such as gender, owning a house, location of business, home origin, family expenditure and awareness of Murabaha have shown no statistical significance in influencing the level of microcredit approved.

Table 6.3. Heckman outcome equation Tobit estimation results for factors influencing the level of loan approval in formal microcredit markets in Khartoum state, Sudan

Variable	Coefficient	Z	P>[z}
Gender	73.354	0.06	0.954
Value of assets	0.190	1.97	0.049**
Household expenditure	-0.135	1.56	0.119
Extra income	2244.904	1.94	0.052*
Dwelling	543.194	0.45	0.651
Size of business	3140.983	2.93	0.003***
Home of origin	29.924	0.03	0.978
Zone	1249.546	1.11	0.266
Awareness of Murabaha	522.090	0.29	0.774
Business records	2945.177	2.71	0.007***
Cons.	-1848.327	0.50	0.619

*****, **,* denote significance at 1%, 5% and 10% respectively**

6.4. The extent and distribution of the current supply-demand gap among various borrower groups in Khartoum State

This section uses data collected from the survey of MSEs' owners to analyse the extent and distribution of the current supply-demand gap in microcredit borne by various borrower groups in the study area.

Survey results reported in Table 6.4 below show that the rate of approval for those who applied for loans was very high as 85.5% of all applications submitted for microcredit loans were approved (No. of receipients/No. of applications). This may be considered to suggest that there is no large gap between demand for and supply of microcredit in terms of the number of applications approved. However, this should be evaluated against the very

low application rate of 24% as only 165 out of the total sample of 690 of the surveyed households reported applying for microcredit loans. These figures seem to point to the fact that the main issue with outreach of microcredit in Sudan is to focus on critically examining and understanding factors behind such low participation rates (demand constraints). Availability of information and awareness about microcredit and providers' efforts to reach out could be key elements of those, among other factors. This is the task taken by the analyses carried in the following chapters.

Some interesting variations however have been observed in both participation (demand) and approval (supply) between the different categories of borrowers. The fact that close to 100% of both applicants and recipients were from an urban group is not surprising given that the surveyed population and study area (Khartoum State) is primarily urban. The results nevertheless indicate a high approval rate of 67% of applications received from rural-based MSEs. It is clear that MSEs engaged in trade represent the main users and recipients of microcredit in the state (more than 70% of all applications). Approval rates for other types of MSEs (production and services) however, are comparably high at more than about 80%. While the number of applicants and recipients is about equally split between MSE owners whose home origin is from within and from outside Khartoum, those from within the state have higher approval rates (92%) compared to 80% for those from outside the state.

While many more applications are received from small compared to micro MSEs, the gap in the approval rates between the two does not seem too large. A similar story prevails among male and female owners of MSEs. These results suggest that although, in general, there seem to be no clear biases in approval rates among various groups, the problem of low participation appears to be bigger among female and micro owners as well as among those whose business is production and services and those whose home origin is outside the state.

Table 6.4 Sample estimate of demand for and supply of loans and size of supply-demand gap among different borrower groups in Khartoum State, Sudan

	Demand		Supply		
Borrower group	**No. of applicants**	**% Share of applications**	**No. of recipients**	**% Share of applications**	**% Received**
Size of business					
Micro	66	40	53	37.6	80.3
Small	99	60	88	62.4	88.9
Total	165	100	141	100	NA
Gender					
Female	46	27.9	43	30.5	93.5
Male	119	72.1	98	69.5	82.4
Total	165	100	141	100	NA
Type of activity					
Trade	122	73.9	**107**	75.9	87.7
Production	17	10.3	14	9.9	82.4
Services	26	15.8	20	14.2	76.9
Total	165	100	141	100	NA
Home origin					
Khartoum state	74	44.8	68	48.2	91.9
Other states	91	55.2	73	51.8	80.2
Total	165	100	141	100	NA
Mode of living					
Rural	3	1.8	2	1.4	66.7
Urban	162	98.2	139	98.6	85.8
Total	165	100	141	100	NA

Source: Survey data 2013

The same pattern was also observed when one works with amounts rather than number of applications (% received column), again emphasizing the point that the main source of the hidden gap and variations come from low participation rates (the proportion of MSEs applying for microcredit).

This confirms results of other studies which found that market penetration of formal microcredit lending in the urban sections of Khartoum state has not exceeded 8% of the total potential market demand estimated at 1.5 million clients (PlaNet Finance, 2007).

6.5. Other attributes of potential users of microcredit in Sudan

This section uses data collected from the survey of MSEs' owners to describe key attributes of this group of potential users of microcredit targeted by the study. Summary statistics about key demographic and socioeconomic attributes of the surveyed population are given in Appendix 5.1.1. Discussion

of certain aspects related to cost to client and repayment are presented and discussed below.

6.5.1. Cost to client

As has been argued in the literature review chapter, the cost to client has been considered to be a major factor in limiting demand for credit by MSEs. This section uses survey data to derive estimates of average costs incurred by applicants on various items of costs in the application process. Estimates of costs to client reported in Table 6.5 indicate that the cost of a feasibility study as part of banks' requirements for approval contributes the highest share (26.25%) of total costs followed by opportunity costs [12] (20.17%) and transportation costs [13] (18.28%). The total average cost to client of SDG 211.55, however, represents a very small share of the amount of loan applied for (2.2%) and amount approved (3.3%). Compared to above reported interest charges of a 14% average, it appears that cost-to-client is not expected to be a major factor or constraint to participation in (applying for) microcredit in Sudan.

Table 6.5 Cost incurred by sample respondents on bank application procedures (N 165)

Type of cost	**Average cost (SDG)**	**%Share of average cost**
Value added tax[14]	28.88	13.65
Transportation cost	38.67	18.28
Subsistence cost[15]	26.82	12.68
Feasibility study cost[16]	55.53	26.25
Consultancy cost[17]	6.33	2.99
Opportunity cost	42.67	20.17
Other cost	12.65	5.98
Total	**211.55**	**100**
		% Share of total cost to client
Average amount of credit applied for	9296.00	2.2
Average amount of credit approved	6480.00	3.3

Source: Survey data 2013

[12] Value of time forgone to apply for, get and repay loan.
[13] Cash expenses on transportation to obtain and repay loan
[14] Taxes paid for documentation related to application for and procurement of loan.
[15] Cash expenses of food and drinks etc. related to application and procurement of loan.
[16] The fees that the MSE owner paid for conducting a feasibility study of his intended investment project .
[17] Cost incurred on any business or legal consultancy to apply for or procure loan.

6.5.2. Repayment performance

Table 6.6 shows loan repayment performance of borrower groups that are classified according to the size of business, gender, business location, type of activity, home of origin and mode of living. In general, the rate of repayment for those who were approved for loans is very high (90%) as 127 borrowers repaid their loans from a total of 141. This may be attributed to the severe consequences of strict enforcement of law and regulations associated with the Murabaha Islamic mode of finance which ultimately leads to imprisonment of borrowers in case of default. However, some minor differences in the repayment rate exist among and between these groups. The rate of loan repayment by both micro and small enterprises is very high and the size of business seems to have no significant effect on loan repayment behaviour of microcredit users.

Table 6.6 Sample estimate of rate of loan repayment among different borrower groups in Khartoum State, Sudan

Borrower group	No. of applicants approved for credit	No. of applicants who repaid loans	% of applicants who repaid loans
Size of business			
Micro	54	48	88.89
Small	87	79	90.80
Total	141	127	90.07
Gender			
Female	42	36	85.71
Male	99	91	91.92
Total	141	127	90.07
Area			
Khartoum area	81	77	95.06
Other areas	60	50	83.33
Total	141	127	90.07
Type of activity			
Trade	106	93	87.74
Production	15	15	100
Services	20	19	95
Total	141	127	90.07
Home origin			
Khartoum state	68	61	89.71
Other states	73	66	90.41
Total	141	127	90.07
Mode of living			
Rural	2	2	100
Urban	139	125	89.93
Total	141	127	90.07

Source: Survey data 2013

It appears that male borrowers peform better than their female counterparts by a rate of 6 percentage points higher in loan repayment. Rate of repayment among borrowers whose businesses are located in Khartoum area (95%) is higher compared to borrowers whose businesses are located in the other two areas collectively (90%). Repayment performance also depends on the type of activities that borrowers are engaged in. Those who are involved in production activities rank first as all of them repaid their loans and borrowers from the service sector come second with a repayment rate of 95% and finally those who are involved in trade form the lowest rate (88%). The rate of repayment among borrowers from within Khartoum appears to be almost equal to that among borrowers who came from other states of the country collectively. Regarding the influence of mode of living on repayment behaviour, it is clear that borrowers who reside in rural areas perform better by 10 percentage point than those who live in the urban areas of Khartoum State.

6.6. Conclusions and implications of the study

This study employed the Heckman two step sample selection model to analyse determinants of approval and level of approval (amount) of microcredit to MSEs owners in Khartoum state, Sudan. The study used cross section data from surveys of microcredit providers and 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 decision to approve microcredit and level of approval. 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 such as awareness of Murabaha mode of finance and number of employees. While a number of household attributes were found to be important determinants of the decision to approve microcredit, influences of these factors on amount of credit provided were statistically insignificant in stage two of the Heckman selection estimation. Conversely, a number of key business-related characteristics appear to significantly affect

the level of formal microcredit approval measured by the amount of microcredit provided. 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 MSEs in Sudan.

One key finding relates to the effect of awareness of the predominant mode of microcredit, the Murabaha Islamic system. As expected, awareness of Murabaha appears to positively influence the decision to approve applications for microcredit. This indicates the importance of more efforts to improve awareness of Islamic modes of finance particularly the Murabaha contract. Also training on business management was found to have a significant positive influence on formal lenders' decision to approve microcredit. This suggests that training of MSE owners, like awareness of microcredit would contribute to better ability among MSEs operators to assess and manage risks associated with borrowing from formal lenders.

The study also confirmed the importance of other key business related factors such as maintaining accounting records and business size, particularly for the level of microcredit provided. The results tend to suggest that relatively larger and better managed MSEs, are more likely to be approved for larger amounts of microcredit. Accordingly, efforts and innovative measures to improve managerial skills and financial knowledge of relatively smaller and less equipped firms are needed to reduce the bias towards larger size and better skilled firms in provision of microcredit. This should go hand in hand with efforts and measures to ease the negative influences of important lender-related factors such as collateral requirement as well as collateral-related factors the effects of which have been tested and reported earlier such as value of assets owned, ownership of a dwelling, maintaining business records, location and size of the business, training on business, household expenditure, ability to provide collateral, home origin and having other sources of income. 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.

Among the household attributes found to be of significance is the interesting finding on the influence of gender which revealed that female-owned MSEs are more likely to be approved for microcredit. This could be an indication that current microcredit suppliers are targeting female MSE owners and suggests the need to provide the necessary complementary support for strengthening business skills and entrepreneurship of women-managed MSEs. Establishment of units and centres for women to undertake training on development of small-scale businesses and craftsmanship in addition to provision of diversified financial products that will suit their circumstances and needs would, therefore, enhance the effectiveness of current microcredit supply emphasis on balancing the gender factor. Other important factors include economic status attributes such as income and value of assets. Results indicate that MSEs run by households at higher income brackets are more likely to be approved for microcredit as well as for larger amounts. It is accordingly important to introduce measures that target MSEs in the lower economic status segments to empower such target groups such as increased awareness of Islamic modes of finance, training and other complementary innovative mechanisms that would improve their managerial ability, collateral and repayment security and effective access to microcredit.

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. It is also important to consider the current bias against the relatively disadvantaged migrants from certain geographical locations of the country by launching lending policies and outreach programs to strengthen their effective access to formal microcredit institutions, possibly through raising awareness of the existence of microcredit services and creation of special social networks and beneficiary groups (e.g. cooperatives, etc.).

6.7. Summary

This chapter analyzed determinants of the decision to provide credit and level of credit provided by formal microcredit institutions to MSEs in Khartoum state of Sudan. The study employed the Heckman two-stage selection model to analyze detailed data from lenders and firm-level surveys of MSEs operating in the state. Results indicate certain biases of the current microcredit supply system towards larger size, more skilled, higher asset endowed and higher income status MSE firms which seem to strongly correlate with and reflect better collateral and repayment abilities. Appropriate innovative institutional and policy measures are therefore needed to balance such biases and improve access to and provision of microcredit to relatively smaller, less asset, income and skill endowed MSE operators and those migrating from relatively remote geographic regions with lower social networks and connections in Khartoum state.

Data collected from survey of MSEs' owners were used to analyse the supply-demand gap in microcredit borne by various borrower groups in the study area. Results show that the rate of approval for those who applied for loans was very high (85%) which indicates that the cause of the problem is the low participation in microcredit rather than a supply-demand gap problem. The survey data were also used to derive estimates of average costs incurred by applicants on various items in the application process. Compared to interest charges of a 14% average, average total cost is not expected to be a major factor or constraint to participation in microcredit in Sudan. Results from the survey data also indicate some minor differences in the repayment rate among and between the different borrower groups. In general, the rate of repayment for those who were approved for loans is very high (90%) as 127 borrowers repaid their loans from a total of 141. These results confirm the severe consequences of the enforcement regulations and measures associated with the Murabaha contract that ultimately lead to the imprisonment of defaulting clients.

CHAPTER SEVEN

SUMMARY, CONCLUSIONS, IMPLICATIONS AND LIMITATIONS OF THE STUDY

7.1. Introduction

Small-scale businesses (MSEs) in Sudan have been the primary absorber of labour force over the past years and the main source of income for most of the people who do not find job opportunities in both the private and public sectors. MSEs are also the major providers of products and services for local markets, particularly the low-income segments with limited purchasing power (Awad in UNICONS, 2006b; UNICONS, 2011). Despite this significant role, the sector has over the years experienced many constraints that have impeded realization of its full potential. Limited access to financial services has been identified as a major constraint.

Few studies have been conducted to investigate causes of the weak performance of microfinance in Sudan. The main conclusion of these studies is that there is a large gap between the demand for and supply of formal microcredit in many regions in Sudan. The said studies described microfinance offered by banks, which are mainly credit-driven, as inadequate and unaffordable and as a result most of the microcredit services take place within the informal sector which is costly and risky. Although previous studies provided useful information about the MSEs sector of the Sudanese economy, important issues for appropriate policy design and institutional interventions have not been addressed. For instance, the existing studies have not analysed and measured the extent of influences of key factors on MSEs participation and level/intensity of participation in formal microcredit. Factors influencing banks' decision of approval and level of approval of microcredit have also not been analysed. Moreover, the said studies did not measure the extent of the microcredit supply-demand gap among the different borrower groups. The present study attempted to contribute to bridging this

knowledge gap about the apparently failing microcredit policies and regimes in Sudan.

To achieve this objective, this study focused on three main themes. The first theme was the study of individual, business and institution-related factors that determine decision of MSEs owners' to participate in microcredit markets and level of that participation. The second theme was to analyse and measure influences of key factors on formal microcredit supply institutions' decisions to provide credit for MSEs and amounts provided. The third theme investigated the existence and extent of the gap believed to be between demand for and supply of formal microcredit to MSEs Sudan. Findings of the study are hoped to assist makers of formal microcredit policies and managers of its operations understand how the failing microfinance experience of Sudan could be turned around to become effective in poverty reduction and promotion of social and economic development.

This chapter presents a summary of the approach and methods employed by the study and findings of the implemented research to achieve its above stated objectives. The next section summarizes the methods and findings of the study. Policy implications are distilled in section 3. Section 4 presents limitations of the study and potential areas for further research.

7.2. Approach and findings of the study

The study analysed determinants of MSEs' owner's participation in formal microcredit markets. For this purpose, this study employed the Heckman's (1976) two-step selection model as it enables analysis of participation in formal microcredit as a two-stage process involving decision of MSEs owners to participate or not, and then measure their level of participation. Results from the first stage regression indicate that age of MSE owner, being from within Khartoum state, awareness of formal microcredit service, training on business, location of business being in Khartoum, maintaining accounting records, being member of a social group are significant positive determinants of MSEs' decision to participate in formal microcredit. The significant positive result of the effect of awareness of formal microcredit service on

decision to participate supports the second hypothesis, advanced in chapter one, that lack of information and awareness about availability of formal microcredit services are key limiting demand factors. Results from the same first stage regression also indicate that being male, higher household income, more number of employees, lack of collateral and complicated and long banking procedures have a statistically significant negative effect on MSEs' participation in formal microcredit.

Results from the second stage regression of the Heckman's selection model indicate that influences of several factors measuring key business and lender attributes were found to be of positive statistical significance on the intensity/level of participation in microcredit. These factors are awareness of the Islamic Murabaha mode of finance, value of assets, having sources of income other than the business in question and working capital. Other factors were found to be of negative statistical significance on intensity of participation. These factors are awareness of Murabaha mode of finance, ownership of a dwelling and training on business. The influence of cost-to-client attribute on decision to participate in formal microcredit was tested in the first run of the model regression. Nevertheless, this variable did not perform well and was hence excluded from the second model test.

The second theme of this study analysed factors that determine formal microcredit supply to small-scale enterprises in Khartoum State using the same data from the MSEs owners and microcredit providers' survey. Microcredit supply analyses also employed the two-step Heckman selection model to measure influences of household, business and lender-related factors on credit providers' loan approval decisions and amount of credit supplied. Results from the first stage regression indicate that some business attributes and others related to economic status and awareness of the existence of microcredit have significant positive influence on banks' decision to provide microcredit to MSEs. These results indicate that MSEs run by households at high income brackets and who can afford to provide collateral, who received training on business and who are members of social groups are more likely to be approved for microcredit. On the other hand, being male and having higher levels of household expenditure were found to

have significant negative influences on banks' decision to provide microcredit. These results indicate that female-owned MSEs as well as those owned by households with lower levels of expenditure are more likely to be approved for formal microcredit. Some of these results support the third hypothesis advanced in chapter one that perceived low economic status and other business attributes such as lack of collateral and low expertise and business skills, reduce the probability of effective access to formal microcredit. These results are the significant positive effect of the value of assets owned, having extra income from sources other than the business in question, training on business along with the significant negative effect of lack of sufficient collateral and high levels of expenditure on approval decisions. The significant positive result of being member of a social group on approval decision supports the fourth hypothesis advanced in chapter one that social capital and value systems are important determinants of microcredit rationing.

Results from the second stage regression of the Heckman's sample selection model indicate that influences of several factors measuring key business attributes were found to be of high statistical positive significance on the intensity/level of approval of microcredit applications. These factors are the value of assets, having income from sources other than the business in question, size of the business and awareness of Murabaha mode of finance. These results indicate that larger MSEs run by households at high income brackets and aware of the Murabaha mode of finance are more likely to be approved for larger amounts of microcredit.

Results of the second theme of this study suggest that attributes of MSEs which are believed to be good proxies of collateral factor such as value of assets owned, ownership of a dwelling, having income from sources other than the business in question and lower levels of household expenditure are important determinants of approval rates.

This study also used primary data collected from a survey of a total of 690 MSEs in Khartoum State as well as primary and secondary data collected from 21 banks providing microcredit service in the State. In pursuance of the

first objective and research question the study used descriptive statistics to investigate the presence and magnitude of the hypothesized gap between demand and supply of microcredit to MSEs. Results of the supply-demand gap analysis show that the rate of approval for MSEs owners who applied for loans was very high as 85.5% of all applications submitted for microcredit loans were approved. This may suggest that there is no large gap between demand for and supply of microcredit in terms of the number of applications approved. This result rejects the first hypothesis advanced in chapter one that a significant gap currently exists between the demand for and supply of microcredit for all potential borrower groups. However, this should be evaluated against the very low application rate of 24% among the surveyed MSEs ownwers. Although in general there seem to be no clear biases in approval rates among various groups, the problem of low participation appears to be bigger among female and micro owners as well as those whose business is production and services and those whose home origin is outside the state.

This study also used survey data to derive estimates of the average costs incurred by applicants on various items in the application process. Cost-to-client was found to represent a very small fraction of the amount of loan applied for and is relatively small compared to the average interest charged, implying that it is not a major cost item for potential users of microcredit. Repayment rates were found to be high with no significant differences between various groups of borrowers which mean that the risk of default appears to be low. This may be attributed to the severe consequences of strict enforcement of law and regulations under this Islamic system, which ultimately subject borrowers to risk of imprisonment till they repay in case of default

7.3. Implications for policy and research

Results of the participation (demand side) analyses suggest the need for policy measures and strategies 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. The study recommended reform of the Murabaha mode of finance and provision of alternative lower risk options as well as balancing the current unequal distribution of bank branches to improve access and reduce costs to potential clients in currently lacking areas.

Results of the approval of microcredit loans (supply-side) indicate certain biases of the current microcredit supply system towards larger size, more skilled, higher asset endowed and higher income status MSEs which seem to strongly correlate with and reflect better collateral and repayment abilities. Appropriate innovative institutional and policy measures are recommended to balance such biases and improve access to and provision of microcredit to relatively smaller, less asset, income and skill endowed MSE operators and those migrating from relatively remote geographic regions with lower social networks and connections in Khartoum state.

Results of the perceived gap between demand for and supply of microcredit indicate that the problem is a low participation problem rather than a gap in supply of microcredit. This problem is caused by key factors such as those revealed by findings of the demand/participation analyses. These results seem to point to the fact that the main issue with outreach of microcredit in Sudan is to focus on critically examining and understanding factors behind such low participation rates (demand constraints). Availability of information and awareness about microcredit and providers' efforts to reach out could be key elements, among other factors, to be considered by policy makers. Policy makers are recommended to increase awareness of microcredit services as well as the Islamic modes of finance, particularly the Murabaha mode, among potential users of microcredit.

7.4. Limitations of the study and areas of further research

This study has limitations that future research needs to address. The first limitation is that the study could not collect information from informal sources to investigate factors that influence decision to provide informal loans as compared to other formal and semi-formal lenders. This was due to the fact that respondents refused to provide any kind of information about these informal sources. One of the most important attributes this study intended to investigate was the influence of transaction costs (cost-to-serve) on formal providers' decision to approve and level of approval of microcredit. Unfortunately, this study couldn't conduct the intended analysis due to the fact that none of the banks surveyed kept information records on transaction costs associated with microcredit operations.

This study also failed to analyse a very important factor which is the loan purpose or use. Data on this attribute has actually been collected but unfortunately this variable did not perform well and was hence excluded.

The study also intended to collect information from banks on collateral security which varies from a bank to another according to the nature of the bank and the loan in question. Banks however, do not disclose information on their transactions by client and hence the study had to rely on information collected from the primary MSEs owners' survey of relevance to the collateral factor effects. Another limitation is that this study conducted analyses on the Islamic Murabaha mode being the most commonly used contract in all banks and non-bank microfinance operations. The study recommends future research to pursue studies on other Islamic modes of finance as alternatives for the Murabaha mode in question to minimize the risk burden associated with this system on both potential and existing low income borrowers.

The study could not identify shares of the various formal microcredit providers in the total amount of microcredit provided in the State, as no information was collected from respondents about which institution they have applied for loan to. Future research is recommended to accomplish this task.

In addition to the three types of business (trade, production, service), farming activities were intended to be included in the analyses. However, due to the limited budget available for the survey, MSEs sub-strata that had few MSEs were added to other neighbouring strata and this left no representation of the said activities. Researchers are recommended to conduct studies on issues associated with demand and/or supply of formal microcredit to small-scale farmers as well as their repayment performance behaviour in these microcredit markets.

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APPENDICES

Appendix 1. Total number of enterprises in the seven localities of the three areas of Khartoum State (Source: Localities and Administrative Units and Sections)

Area	Locality	Sector	Rural			Urban			Total
			Small	Micro	Total	Small	Micro	Total	
Omdurman	Karari	Production	19	0	19	867	499	1366	1385
		Trade	294	0	294	3591	1310	4901	5195
		Service	29	5	34	869	1678	2547	2581
		On-farm	0	0	0	38	134	172	172
	Omdurman	Production	43	11	54	177	99	276	330
		Trade	205	45	250	2647	1379	4026	4276
		Service	50	88	138	429	1542	1971	2109
		On-farm	2	6	8	172	141	313	321
	Oumbada	Production	0	0	0	852	224	1076	1076
		Trade	47	0	47	8933	3012	11945	11992
		Service	1	1	2	954	2166	3120	3122
		On-farm	2	0	2	32	230	262	264
Khartoum North	Bahri	Production	43	7	50	494	83	577	627
		Trade	247	106	353	2944	828	3772	4125
		Service	22	25	47	631	640	1271	1318
		On-farm	26	0	26	115	73	188	214
	Sharq Elneel	Production	155	570	725	361	579	940	1665
		Trade	613	566	1179	2767	2310	5077	6256
		Service	45	279	324	430	1124	1554	1878
		On-farm	41	50	91	0	114	114	205
Khartoum	Khartoum	Production	0	0	0	650	324	974	974
		Trade	0	0	0	12270	7794	20064	20064
		Service	0	0	0	913	635	1548	1548
		On-farm	0	0	0	130	337	467	467
	Gebel Oulia	Production	10	44	54	688	310	998	1052
		Trade	0	572	572	5536	3577	9113	9685
		Service	0	32	32	165	1878	2043	2075
		On-farm	8	0	8	99	59	158	166
Total									85,142

Appendix 2. Weight factors for sub-strata of MSEs in the seven localities of Khartoum State = (Number of MSEs in each cell / Total number of MSEs in the State)

Area	Locality	Sector	Rural		Urban	
			Small	Micro	Small	Micro
Omdurman	Karari	Production	0.0002	0.0000	0.0102	0.0059
		Trade	0.0035	0.0000	0.0422	0.0154
		Service	0.0003	0.0001	0.0102	0.0197
		On-farm	0.0000	0.0000	0.0004	0.0016
	Omdurman	Production	0.0005	0.0001	0.0021	0.0012
		Trade	0.0024	0.0005	0.0311	0.0162
		Service	0.0006	0.0010	0.0050	0.0181
		On-farm	0.0000	0.0001	0.0020	0.0017
	Oumbada	Production	0.0000	0.0000	0.0100	0.0026
		Trade	0.0006	0.0000	0.1049	0.0354
		Service	0.0000	0.0000	0.0112	0.0254
		On-farm	0.0000	0.0000	0.0004	0.0027
Khrtoum North	Bahri	Production	0.0005	0.0001	0.0058	0.0010
		Trade	0.0029	0.0012	0.0346	0.0097
		Service	0.0003	0.0003	0.0074	0.0075
		On-farm	0.0003	0.0000	0.0014	0.0009
	Sharq Elneel	Production	0.0018	0.0067	0.0042	0.0068
		Trade	0.0072	0.0066	0.0325	0.0271
		Service	0.0005	0.0033	0.0051	0.0132
		On-farm	0.0005	0.0006	0.0000	0.0013
Khartoum	Khartoum	Production	0.0000	0.0000	0.0076	0.0038
		Trade	0.0000	0.0000	0.1441	0.0915
		Service	0.0000	0.0000	0.0107	0.0075
		On-farm	0.0000	0.0000	0.0015	0.0040
	Gebel Oulia	Production	0.0001	0.0005	0.0081	0.0036
		Trade	0.0000	0.0067	0.0650	0.0420
		Service	0.0000	0.0004	0.0019	0.0221
		On-farm	0.0001	0.0000	0.0012	0.0007

Appendix 3. Sample allocation of MSEs in the seven localities of Khartoum State (Weight factor* Total sample size = 690)

Area	Locality	Sector	Rural		Urban		Total
			Small	Micro	Small	Micro	
Omdurman	Karari	Production	0	0	7	4	
		Trade	2	0	29	11	
		Service	0	0	7	14	
		On-farm	0	0	0	1	
	Omdurman	Production	0	0	1	1	
		Trade	2	0	21	11	
		Service	0	1	3	12	
		On-farm	0	0	1	1	
	Oumbada	Production	0	0	7	2	
		Trade	0	0	72	24	
		Service	0	0	8	18	
		On-farm	0	0	0	2	**266**
Khartoum North	Bahri	Production	0	0	4	1	
		Trade	2	1	24	7	
		Service	0	0	5	5	
		On-farm	0	0	1	1	
	Sharq Elneel	Production	1	5	3	5	
		Trade	5	5	22	19	
		Service	0	2	3	9	
		On-farm	0	0	0	1	**132**
Khartoum	Khartoum	Production	0	0	5	3	
		Trade	0	0	99	63	
		Service	0	0	7	5	
		On-farm	0	0	1	3	
	Gebel Oulia	Production	0	0	6	3	
		Trade	0	5	45	29	
		Service	0	0	1	15	
		On-farm	0	0	1	0	**292**
Total							**690**

Appendix 4. Sample allocation after adding cells containing three and less enterprises to other neighbouring cells

Area	Locality	Sector	Rural			Urban			Total
			Small	Micro	Total	Small	Micro	Total	
Omdurman	Karari	Production				7	4	11	11
		Trade				31	11	42	42
		Service				8	14	22	22
		On-farm							
	Omdurman	Production							
		Trade				24	12	36	36
		Service				6	14	20	20
		On-farm							
	Oumbada	Production				7	4	11	11
		Trade				73	25	98	98
		Service				8	18	26	26
		On-farm							
Khartoum North	Bahri	Production				4	0	4	4
		Trade				26	8	34	34
		Service				6	6	12	12
		On-farm							
	Sharq Elneel	Production		6	6		8	8	14
		Trade	5	5	10	23	18	41	51
		Service				7	10	17	17
		On-farm							
Khartoum	Khartoum	Production				6	6	12	12
		Trade				100	63	163	163
		Service				7	5	12	12
		On-farm							
	Gebel Oulia	Production				6		6	6
		Trade		5	5	47	29	76	81
		Service					18	18	18
		On-farm							
Total									690

Appendix 5. Demographic, social and economic attributes

A.5.1 Demographic and social attributes

As appendix 5.1.1 shows, the selected sample of MSEs owners is 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%). The average family size in our sample is four. About two thirds (65%) of the respondents are married while unmarried singles form the bulk (35%) of the rest. Education levels among MSEs owners appear high (above 80%) with those who completed secondary school education dominating (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 neighbouring states (Central 26% and Northern 13%) while about a quarter came from states to the west (Kordofan 16% and Darfur 11%). Most of those from Khartoum and other neighbouring states seem to reside in the Khartoum zone (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. The majority of Arab tribes in Khartoum State came from the neighbouring states (Central 28.3%, Northern 10.9% and Eastern 5.7%) compared to those from states to the west (28.2%) and those from within Khartoum State (26.9%).

A.5.2 Economic activity and business attributes

As appendix 5.2.1 shows, trade 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 in rural (29%) compared to urban areas (8%) whereas none of them engaged in services in rural areas. The majority of respondents in Khartoum state are engaged in trade activities (Khartoum 83.5%, Omdurman 66.2% and Khartoum North 64.4%) followed by those

engaged in services activities (Khartoum 10.3%, Omdurman 25.5% and Khartoum North 22%).

Appendix 5.2.2 shows that the majority of respondents from urban areas (97%) participated in nonbank microcredit compared to only (3%) of those from rural areas. About half of respondents from neighbouring states (Central 28%, Northern 14% and Eastern 10%) participated in nonbank microcredit compared to those from within Khartoum showing (30%) and states to the west (Kordofan 11% and Darfur 8%) showing about (20%).

From appendix 5.2.3, about one quarter (24.2%) of respondents from urban areas applied for microcredit compared to those from rural areas showing (14.3%). More than one third (39.2%) of respondents from within Khartoum applied for microcredit compared to those from neighbouring states (Central 17.6%, Northern,14.8% and Eastern 14%) and states to the west (Kordofan 21% and Darfur 21.8%). One third of respondents from Khartoum area applied for credit (33.2%) compared to (20.3%) of those from Omdurman and (10.6%) of those from Khartoum North. More than one third (35.1%) of the female respondents applied for credit as compared to only (21.3%) of male respondents. About one quarter (24.7%) of the small enterprises owners applied for credit compared to only (22.8%) among the micro enterprise owners. Participation among respondents from the production sector appears the highest (29.3%) followed by respondents from trade (24.2%) and those from services sector (2.5%).

As appendix 5.2.4 shows, the rate of credit approval among respondents from urban areas appears higher (85.8%) than among those from rural areas (66.7%). The majority of applicants who were approved for credit were from within Khartoum state (48.2%) followed by those from neighbouring states (Central 17.7 and Northern 7.1%) while those from states to the west form a quarter (Kordofan 14.2%, Darfur 10.7%) compared to a minority of those from states to the east (2.1%). More than one half of those who were approved for credit were from Khartoum area (57.4%) while those from the other two areas form the bulk (Omdurman 36.2%, Khartoum North 6.4%) of the rest. The rate of credit approval among female respondents appears higher

(93.5%) than that among male respondents (82.3%). Close to two thirds of those who were approved for credit were small enterprise owners (62.4%) compared to about only one third (37.6%) of the micro enterprise owners. The majority of those who were approved for credit were from the trade sector (75.9%) compared to only one quarter of those from the other two sectors (Services 15.8% and Production 10.3%).

Appendix 5.2.5 shows that the majority of respondents who repaid their loans were from urban areas (98.6%) while none of those from rural areas defaulted. About half of those who repaid their loans were from within Khartoum State (48%) compared to a quarter of those from neighbouring states (Central 18.1%, Northern 7.1% and Eastern 1.6%) and a quarter of those from the western states (Kordofan 13.4% and Darfur 11.8%). The majority of respondents who repaid their loans were from Khartoum area (60.6%) followed by those from Omdurman (33.9%) while those from Khartoum North form the minority (5.5%). The repayment rate among male respondents was higher (91.9%) than among female respondents (85.7%). Close two thirds of those who repaid their loans were small enterprises owners (62.2%) compared to about one third among the micro enterprises owners (37.8%). All respondents engaged in production sector repaid their loans (100%) followed by those from services (95%) and those from trade (78.7%) sectors.

Appendix 5.1.1 Demographic and social attributes of surveyed owners of MSEs in Sudan

Attributes	Gender		Age group (years)			Religion		Average family size
	Male	Female	25-40	40-60	Other	Muslim	Other	
All sample	**81%**	**19%**	**56.5%**	**28.3%**	**15.2%**	**98.2%**	**1.8%**	**4**

Attributes	Levels of Education				Marital status		
	Preschool & elementary	Secondary	University	Other	Single	Married	Other
All sample	**12.9%**	**40.4%**	**27.8%**	**18.9%**	**30.3%**	**64.8%**	**4.9%**

Attributes	Home origin						
	Khartoum	Central	Northern	Eastern	Kordofan	Darfur	Total
All sample	**27.39%**	**26.38%**	**12.75%**	**6.23%**	**15.94%**	**11.30%**	**100%**
Khartoum	60.32%	39.56%	45.45%	48.84%	22.73%	25.64%	NA
Omdurman	28.04%	37.91%	29.55%	30.23%	55.45%	56.41%	NA
Khartoum North	11.64%	22.53%	25.00%	20.93%	21.82%	17.95%	NA

Attributes	**Ethnicity**						
	Khartoum	**Central**	**Northern**	**Eastern**	**Kordofan**	**Darfur**	**Total**
All sample	**26.56%**	**27.13%**	**12.20**	**6.26%**	**16.37%**	**11.40%**	**100%**
Arab tribes	26.9%	28.3%	10.9%	5.7%	15.2%	13%	100%
Non-Arab tribes	26.3%	25.5%	14.1%	7.1%	18%	9%	100%

Appendix 5.2.1 Economic activities attributes of surveyed owners of MSEs in Sudan

Attributes	Mode of living			Home origin							Area			
	Rural	Urban	Total	Khartoum	Central	Northern	Eastern	Kordofan	Darfur	Total	Khartoum	Omdurman	Khartoum North	Total
All sample	**3%**	**97%**	**100%**	**27.4%**	**26.4%**	**12.8%**	**6.2%**	**15.9%**	**11.3%**	**100%**	**42.3%**	**38.6%**	**19.1%**	**100%**
Trade	71.4%	73.2%	NA	76.19	74.18	76.14	72.09	65.45	71.79	NA	83.5%	66.2%	64.4%	NA
Production	28.6%	07.8%	NA	6.35	10.44	6.82	4.65	11.82	7.69	NA	06.2%	08.3%	13.6%	NA
Services	00.0%	19.0%	NA	17.46	15.38	17.05	23.26	22.73	20.51	NA	10.3%	25.5%	22.0%	NA

Appendix 5.2.2 Nonbank credit participation attributes of surveyed owners of MSEs' in Khartoum State, Sudan

Attributes	Mode of living			Home origin							Area			
	Rural	Urban	Total	Khartoum	Central	Northern	Eastern	Kordofan	Darfur	Total	Khartoum	Omdurman	Khartoum North	Total
All sample	2.7%	97.3%	100%	29.5%	28%	13.8%	9.6%	10.7%	8.4%	100%	59%	16.9%	24.1%	100%
Semi-formal source	0.0%	25.6%	NA	28.6%	16.4%	33.3%	24%	35.7%	13.6%	NA	20.1%	38.6%	27%	NA
Informal source	100%	74.4%	NA	71.4%	83.6%	66.7%	76%	64.3%	86.4%	NA	79.9%	61.4%	73%	NA

Appendix 5.2.3 Formal credit participation attributes of surveyed owners of MSEs in Khartoum State, Sudan

Attributes	Mode of living			Home origin							Area			
	Rural	Urban	Total	Khartoum	Central	Northern	Eastern	Kordofan	Darfur	Total	Khartoum	Omdurman	Khartoum North	Total
All sample	**3%**	**97%**	**100%**	**27.4%**	**26.4%**	**12.8%**	**6.2%**	**15.9%**	**11.3%**	**100%**	**42.3%**	**38.6%**	**19.1%**	**100%**
Applied	14.30%	24.2%	NA	39.2%	17.6%	14.8%	14%	21%	21.8%	NA	33.2%	20.3%	10.6%	NA
Didn't apply	85.70%	85.8%	NA	60.8%	82.4%	85.2%	86%	79%	78.2%	NA	66.8%	79.7%	89.4%	NA

Attributes	Gender			Size of business			Type of activity			
	Female	Male	Total	Small	Micro	Total	Trade	Production	Service	Total
All sample	**19%**	**81%**	**100%**	**58.1%**	**41.9%**	**100%**	**73.2%**	**8.4%**	**18.4%**	**100%**
Applied	35.1%	21.3%	NA	24.7%	22.8%	NA	24.2%	29.3%	02.5%	NA
Didn't apply	64.9%	78.7%	NA	75.3%	77.2%	NA	75.8%	70.7%	79.5%	NA

Appendix 5.2.4 Formal credit approval attributes of surveyed owners of MSEs in Khartoum State, Sudan

Attributes	Mode of living			Home origin							Area			
	Rural	Urban	Total	Khartoum	Central	Northern	Eastern	Kordofan	Darfur	Total	Khartoum	Omdurman	Khartoum North	Total
All sample	**1.8%**	**98.2%**	**100%**	**44.9%**	**19.4%**	**7.9%**	**3.6%**	**13.9**	**10.3%**	**100%**	**58.8%**	**32.7%**	**8.5%**	**100%**
Approved	66.7%	85.8%	NA	48.2%	17.7%	7.1%	2.1%	14.2%	10.7%	100%	57.4%	36.2%	06.4%	100%
Not approved	33.3%	14.2%	NA	25%	29.2%	12.5%	12.5%	12.5%	8.3%	100%	66.7%	12.5%	20.8%	100%

Attributes	Gender			Size of business			Type of activity			
	Female	Male	Total	Small	Micro	Total	Trade	Production	Service	Total
All sample	**27.9%**	**72.1%**	**100%**	**60%**	**40%**	**100%**	**73.9%**	**10.3%**	**15.8%**	**100%**
Approved	93.5%	82.3%	NA	62.4%	37.6%	100%	75.9%	10.3%	15.8%	100%
Not approved	6.5%	17.7%	NA	54.2%	45.8%	100%	62.5%	12.5%	25%	100%

Appendix 5.2.5. Formal credit repayment performance attributes of surveyed MSEs owners in Khartoum State, Sudan

Attributes	Mode of living			Home origin							Area			
	Rural	Urban	Total	Khartoum	Central	Northern	Eastern	Kordofan	Darfur	Total	Khartoum	Omdurman	Khartoum North	Total
All sample	**1.4%**	**98.6%**	**100%**	**48.2%**	**17%**	**7.1%**	**2.1%**	**15%**	**10.6%**	**100%**	**575%**	**36.1%**	**64%**	**100%**
Repaid oans	1.6%	89.4%	100%	48%	18.1%	7.1%	1.6%	13.4%	11.8%	100%	60.6%	33.9%	5.5%	100%
Didn't repay loans	0%	100%	100%	50%	7.1%	7.1%	7.1%	28.7%	0%	100%	28.6%	57.1%	14.3%	100%

Attributes	Gender			Size of business			Type of activity			
	Female	Male	Total	Small	Micro	Total	Trade	Production	Service	Total
All sample	**29.8%**	**70.2%**	**100%**	**61.7%**	**38.3%**	**100%**	**75.2%**	**10.6%**	**14.2%**	**100%**
Repaid loans	85.7%	91.9%	NA	62.2%	37.8%	100%	78.7	100%	95%	NA
Didn't repay loans	14.3%	8.1%	NA	57.1%	42.9%	100%	12.3	0%	5%	NA

Appendix 6. Rate of interest and microcredit portfolio in banks providing microcredit in Khartoum State (2013)

No.	Name of bank	Profit margin (%)	Microcredit portfolio (%)
1	Family Bank	14	100
2	Savings and Social Development Bank	12.75	74.3
3	Agricultural Bank of Sudan	14	16
4	Nile Bank	12	7
5	Industrial Development Bank	12	1.66
6	Blue Nile Mashreq Bank	12	1.43
7	Tadamon Islamic Bank	12	0.7
8	Animal Resources' Bank	12	8
9	El-Salam Bank	11.9	1.4
10	Exports Development Bank	14	14
11	Sudanese French Bank	14.5	3
12	Aljazeera Sudanese Jordanian Bank	12	13
13	Real Estate Commercial Bank	11	9
14	Bank of Khartoum	14	3
15	El-Nilien Bank	12	3.5
16	Farmer's Commercial Bank	12	14.6
17	Omdurman National Bank	12.5	0.65
18	Saudi Sudanese Bank	13	0.7
19	El-Shamal Islamic Bank	13.5	6
20	Workers' National bank	12	5
21	Baraka Bank (Sudan)	12	3
	Average	11.95	13.61

Appendix 7. Distribution of bank branches providing microcredit in the three areas of Khartoum State (2013)

Area	Number of bank branches	Percentage (%)
Khartoum	103	60.95
Omdurman	39	23.07
Khartoum North	27	15.97
Total	169	100

Appendix 8. Summary statistics of MSEs owners' attributes tested as proxies for collateral requirement (2013)

Variable	Repayment performance (%)		
	Repaid	Didn't repay	Total
Size of business			
Small	62.2	57.14	NA
Micro	37.8	42.86	NA
Ownership of dwelling			
Owned house	70.87	78.57	NA
Did not own house	29.13	21.43	NA
Extra income			
Had extra income	96.15	3.85	100
Didn't have extra income	86.52	13.48	100
Training on business			
Received training	92.31	7.69	100
Did not receive training	71.65	10.78	100
Awareness of Murabaha			
Aware of Murabaha	92.13	85.71	NA
Unaware of Murabaha	07.87	14.29	NA
Location of business			
Khartoum area	60.63	28.57	NA
Omdurman area	33.86	57.14	NA
Khartoum North area	5.51	14.29	NA
Home of origin			
Khartoum state	48.03	50	NA
Neighbouring states	25.20	14.28	NA
Eastern states	01.57	7.14	NA
Western states	25.20	28.58	NA
Household expenditure			
Highest amount of expenditure (SDG)	5.56	15.38	NA
Lowest amount of expenditure (SDG)	8.73	15.38	NA
Value of assets owned			
Highest value of assets (SDG)	95	5	100
Lowest value of assets (SDG)	80	20	100
Ability to provide collateral			
Able to provide collateral	99.21	100	NA
Unable to provide collateral	0.79	0	NA
Accounting records			
Maintained accounting records	95.95	4.05	100
Did not maintain accounting records	83.58	16.42	100

Appendix 9. Questionnaire of MSEs owners survey:

Section 1(demographic, social and economic attributes)

1. **Gender**
   a. Male
   b. Female
2. **Age**
   a. 18 – 25 years.
   b. 25 – 40 years.
   c. 40 – 60 years.
   d. Above 60 years.

3. **Dwelling**
   a. Owned house.
   b. Leased house.
   c. Hosted.
   d. Shanty house.
   e. Other (please specify)……

4. **Home of origin**
   a. Khartoum State.
   b. Central states (Gezira, Sinnar, Blue Nile, White Nile)
   c. Northern states (Shamalia, Nile River)
   d. Eastern states (Gadarif, Kasala, Red Sea)
   e. Kordofan states.
   f. Darfur states.
   g. South Sudan.

5. **Tribe** ……

6. **Do you belong to any social/cultural group or club?**
   a. Yes.
   b. No.

7. **Which of the following group(s) do you belong to?**
   a. Productive/financial group.
   b. Social group.
   c. Governmental/nongovernmental/political group.

8. **Marital status**
   a. Single (never married before)
   b. Married.
   c. Divorced.

d. Widowed.

9. Number of children

a. None.
b. One.
c. Two.
d. Three.
e. Four.
f. More than four.

10. Religion

a. Muslim.
b. Christian.
c. None.
d. Other.

11. Educational level

a. Illiterate.
b. Illiteracy abolishing education.
c. Pre-school (Kindergarten, Khalwa /Religious, Home)
d. Elementary school.
e. Senior secondary school.
f. Undergraduate.
g. Post- graduate.

12. Has any member of the family a regular income?

a. Yes.
b. No.

13. How much income do all members of the family earn monthly?

a. Less than SDG 300.
b. SDG 301 – SDG 600.
c. SDG 1001 – SDG 1,000.
d. SDG 1001 – SDG 2000.
e. More than SDG 2000.
f. I don't know.
g. I refuse to answer.

14. What's your monthly consumption expenditure (Food and non-food expenditure)?

a. Less than SDG 300.
b. SDG 301 – SDG 600.
c. SDG 1001 – SDG 1,000.
d. SDG 1001 – SDG 2000.

e. More than SDG 2000.
f. I don't know.
g. I refuse to answer

15. Do you earn any income other than that from business?

a. Yes.
b. No.
(If the answer is "Yes" please answer question 16)

16. What is the source of your other income?

a. Money transfer from inside Sudan.
b. Money transfer from abroad.
c. Leased property (shop or part of house).
d. Agricultural/non-agricultural investment.
e. Pension/social insurance.
f. Wage from other work.
g. Charity/zakat.
h. Other (please specify)……

17. Do you possess any of the following assets on the personal level?

a. Water supply.
b. Electricity supply.
c. Sewage system.
d. Fridge.
e. Television.
f. Radio.
g. Beds.
h. Chairs.
i. Car.
j. Cell phone.

Section 2 (Business attributes)

1. Type of activity?

a. Trade.
b. Production.
c. Service.
d. Agricultural/animal production.

2. Legal status of business

a. Registered.
b. Temporarily registered.
c. Not registered.

3. **Do you keep accounting records for your business?**
   a. Yes.
   b. No.

4. **Distance from nearest bank that provides microcredit?**
   a. Less than one km.
   b. 1 – 3 kms.
   c. 4 – 6 kms.
   d. 6 – 8 kms.
   e. More than 8 kms.
   f. I don't know.

5. **Annual profit from business?**
   a. Less than SDG 3,000.
   b. SDG 3,001 – SDG 5,000.
   c. SDG 5,001 – SDG 10,000.
   d. SDG 10,001 – SDG 15,000.
   e. More than 15,000.
   f. I don't know.
   g. I refuse to answer.

6. **Annual expenditure on business?**
   h. Less than SDG 3,000.
   i. SDG 3,001 – SDG 5,000.
   j. SDG 5,001 – SDG 10,000.
   k. SDG 10,001 – SDG 15,000.
   l. More than 15,000.
   m. I don't know.
   n. I refuse to answer.

7. **Value of business assets owned?**
   a. Less than SDG 3,000.
   b. SDG 3,001 – SDG 5,000.
   c. SDG 5,001 – SDG 10,000.
   d. SDG 10,001 – SDG 15,000.
   e. More than 15,000.
   f. I don't know.
   g. I refuse to answer

8. **Are you aware of microcredit bank services provided by banks?**
   a. Yes.
   b. No.
   (If the answer is "No" please answer question 9)

9. What are the reasons behind your unawareness of microcredit bank services?

a. I don't know whether there is a bank in my area.
b. The bank in my area doesn't promote for credit.
c. I don't know what microcredit means.

10. How did you get to know about microcredit services provided by banks?

a. Neighbours.
b. Relatives.
c. Business colleagues.
d. Other (Please specify).

11. Have you ever applied for microcredit during the past seven years?

a. Yes.
b. No.
(If the answer is "No" please answer question 12)

12. Why haven't you ever applied for microcredit during the past seven years?

c. Failure of repayment.
d. Religious reasons.
e. I don't trust banks.
f. Unreasonable guarantees.
g. Complicated procedure that takes long.
h. Already indebted much.
i. I can finance my business.
j. My business is not licensed.
k. I have no idea about how and from where to receive credit.
l. There is no bank in my area that provides microcredit.
m. Psychological barrier from banks.
n. Other (Please specify)……

13. Do you intend to apply for microcredit in the future?

a. Yes.
b. No.

14. Please fill in the following table if you have applied for microcredit during the past seven years and explain the purpose of each application from the following:

a. To purchase assets.
b. To finance working capital.
c. Both answers (a) and (b).
d. To meet other non-business obligations.
e. Other (please specify)……

Times	Date of application	Date of provision	Amount applied for	Amount provided	%	Purpose
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

15. How did you access the bank to apply for microcredit?

a. Direct contact.
b. Through a mediator.

16. How do you rate treatment of bank staff from the following?

a. Excellent.
b. Very good.
c. Medium.
d. Unacceptable.
(If the answer is "d" please answer question number 17)

17. How do you specify the unacceptable treatment from the following?

a. Staff treatment.
b. Lengthy procedures.
c. Tough requirements.
d. Guarantees I can't provide.
e. Other (Please specify)……

18. Was the amount of microcredit provided by the bank adequate for your business?

a. Yes.
b. No.

19. Have you repaid all loans you received on due date?

a. Yes.

b. No.

20. How have you accessed seller (s) of materials and equipment?

a. Technical consultation.
b. Business colleagues experience.
c. My own experience.
d. Guidance of financing bank.
e. Other (Please specify).

21. What was the main reason behind not repaying on due date?

a. Some contingent events (Illness, death, delivery ……..etc.)
b. Some unfavourable events (Robbery, fire, low sales ….etc.)
c. I didn't understand financing conditions well (Repayment plan, profit margin……etc.).
d. I saw no reason for repaying in due course.
e. Other (Please specify)……

(In case you failed to repay, please fill in the following table and put the answer letter from answers above in the last column)

Times	Name of bank	Date of provision	Repayment period(months)	Answer number
First				
second				
Third				
Fourth				
Fifth				

22. Have you ever received credit from any nonbank source during the past seven years?

a. Yes.
b. No.
(If the answer is "Yes" please answer question 24)

23. Please name the nonbank source from the following:

a. Volunteering organization.
b. Society in living area.
c. Governmental social support fund.
d. Non-governmental organization (NGO).
e. Nonbank microfinance institution.
f. ROSCA.
g. Borrowed from trader.

h. Borrowed from friend/relative/neighbour/business colleague.

24. How do you compare the treatment of this nonbank source with that of bank(s)?

a. Better.
b. The same.
c. Less.
d. I don't know.
e. I refuse to answer.

25. How many times have you received credit from nonbank source(s)?

a. Once.
b. Twice.
c. Three times.
d. Four times.
e. More than four times.

26. For how long have you been undertaking this business activity?

a. Less than 6 months.
b. 6 - 12 months.
c. 12 – 18 months.
d. 18 – 24 months.
e. 24 – 30 months.
f. 30 – 36 months.
g. More than three years.
h. I don't know.
i. I refuse to answer.

27. Have you ever received any kind of training before or after the commencement of this business activity?

a. Yes.
b. No.

(If the answer is "Yes" please answer question 29)

28. What kind of training have you received from the following?

a. Apprenticeship.
b. Regular vocational training (Institute)
c. Technical school.
d. Other (Please specify)……

29. How do you describe your awareness of Islamic modes of finance in general?

a. Excellent.
b. Very good.
c. Medium.
d. Weak.

e. None.

30. How do you describe your awareness of Murabaha Islamic mode in particular?

a. Excellent.
b. Very good.
c. Medium.
d. Weak.
e. None.

31. In case of knowing about Murabaha mode of finance, do you prefer it to the other Islamic modes of finance?

a. Yes.
b. No.

32. Why do you prefer Murabaha Islamic mode to the other Islamic modes of finance?

a. The only Islamic mode that I know.
b. I know it better than other modes.
c. Bank do not share profit with me.
d. Bank follow up is less than with other modes.
e. Repayment conditions are less burdensome than other Islamic modes.
f. Other (Please specify)……

33. How do you estimate the cost that you incurred on procurement of microcredit from bank(s) every time you applied for it? (please fill in the following table with the information required)

Times	Value added	Transportation cost	Subsistence	Feasibility study	Consultancy cost	Opportunity cost	Other	Total
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

34. From the following list of guarantees, please choose those you think are convenient to you, when you apply for microcredit.

a. House properties.
b. Real estate.
c. Business property.
d. Car.
e. Inventory.
f. Animals/crops.
g. Gold/precious belongings.
h. Personal collateral.
i. Group collateral.
j. Balance at bank.
k. Pension/salary guarantee.
l. Other (Please specify)……

End of questionnaire