The effect of subsidies on the performance and sustainability of microfinance institutions in sub-Saharan Africa

by

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Declaration

I, <u>Menzie Sithembiso Dlamini</u>, declare that this dissertation, submitted for the degree MSc Agric (Agricultural Economics) at the University of Pretoria, is my own work. It has not been submitted before for any other degree or examination at any other university. All sources used or quoted have been properly indicated and acknowledged by means of complete references.

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Date   ……………………………………………

Table of Contents

List of Tables

List of Figures

List of Acronyms

CGAP	Consultative Group to Assist the Poor
CO OPS	Cooperatives Union
CPI	Consumer Price Index
FSS	Financial Self-Sufficiency
GDP	Gross Domestic Product
GNI	Gross National Income
IMF	International Monetary Fund
LDCs	Less-Developed Countries
MBB	MicroBanking Bulletin
MFIs	Microfinance Institutions
MIX	Microfinance Information Exchange
MDC	Malawi Development Corporation
NBFIs	Non-banking Financial Intermediaries
NGOs	Non-Governmental Organisations
OLS	Ordinary Least Squares
OSS	Operational Self-Sufficiency
PAR	Portfolio at Risk
RB	Rural Banks
ROA	Return on Asset
ROE	Return on Equity
SEF	Small Enterprise Fund
SDI	Subsidy Dependant Index
SMEs	Small and Medium Enterprises
SSA	Sub-Saharan Africa
TSE	Times Series Explorer
US$	United States Dollar
WB	World Bank
WDI	World Development Indicator

Abstract

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Microfinance Institutions (MFIs) in sub-Saharan Africa (SSA) and the developing world have over the years attracted and received billions of US dollars (valued at over US$4 billion annually worldwide) in subsidies and concessionary funds. These subsidies are used to capitalize, promote growth, and help improve efficiency, operations and performance of newly established MFIs. At face value these interventions seem positive, yet studies have shown that they can be counterproductive in terms of their effect on the performance, efficiency and self-sustainability of the MFIs. This research addresses this issue by identifying four determinants of MFI's performance and analysing the effect that subsidies have on them.

A quantitative approach was used in the analysis in which the financial data of 92 MFIs were estimated using panel data estimation. The method of variable selection was based on the procedure used by Nawaz (2010). This method of determining the relationship between selected performance and sustainability indicators and subsidy was modelled on the Subsidy Dependant Index (SDI) method of analysis developed by Yaron (1992a) and the Return on Asset (ROA), Operational Self-Sufficiency (OSS) and Financial Self-Sufficiency (FSS) methods of analysis developed by the SEEP Network (2005).

The summary results of the analysis showed that the majority of MFIs (90.22%) were not sustainable nor were they found to be profitable. However, the results show that all the institutions were operationally self-sufficient and that, on average, MFIs in SSA charged higher interest rates than MFIs in other parts of the world. The average OSS was 136.01% showing that MFIs are operationally self-sufficient. However, the average FSS value was

74.32% reflecting that the MFIs are not able to raise enough revenue to cover their capital and indirect costs which would ultimately result in them running out of equity funds.

The inclusion of subsidies in the sustainability regressions resulted in a decline in the ability of the MFIs to attain operational and financial self-sufficiency, thus showing the negative effect subsidies have on the sustainability of MFIs. Inflation and interest rates charged on loans also had a negative effect on sustainability as they resulted in an increase in costs and a decline in the number of low income clients.

MFIs located in wealthier countries were found to be more efficient because of the lower costs associated with having wealthier clients who have larger loan sizes. MFIs in lower income countries have to overcome limitations of weak infrastructures, low population densities and rural markets which increase operating costs.

Older institutions were found to more likely be sustainable than new and young MFIs as expected because of their improved efficiency and productivity and also because they have more experience and are therefore better equipped to overcome challenges. However, by adding subsidy in the analysis the results show that the level of efficiency of MFIs is reduced. The results also show that with increased maturity MFIs are found to be more productive, however, when subsidies are included in the finances the levels of productivity will decline as costs increase.

NBFIs are the most suitable business model to practice in MFIs in Africa according to the findings which reflect that NBFIs are more profitable and efficient than any of the other business models in the sample. However, cooperatives were found to be the most productive business model as they have a stronger borrower to staff ratio than the other institutional types. Furthermore, cooperatives and NBFIs tend to have clients who are better off and therefore can afford to take larger sized loans, unlike clients of NGOs who are poor who struggle to have a stable income.

Chapter 1: Introduction

Microfinance refers to all types of retail financial services aimed at development of the poor (Ledgerwood, 1999). In the three decades since Microfinance Institutions (MFIs) came to prominence, the majority of institutions continue to rely on subsidies to ensure they meet their operational and social obligations of making finance accessible to all (Dannroth, 2009). As with most projects that receive substantial amounts of donated capital funding, there are social impact and accountability considerations that need to be raised such as "Is microfinance still a viable development initiative as it has shown with its tremendous growth and success over the years?" The recent global economic and financial meltdown has brought to the fore the uncertainties surrounding the current status of the majority of MFIs, especially with the reduction in donor funding (Dannroth, 2009).

Microfinance Institutions in sub-Saharan Africa (SSA) and the developing world have over the years attracted and received billions of US dollars (valued at over US$4 billion annually worldwide) in subsidies and concessionary funds (Hashemi et al, 2005; CGAP, 2009b). CGAP (2010) research reveals that the stock of foreign capital investment in the microfinance sector has more than tripled since 2004, much of it drawn by the sectors' seemingly strong growth and reputation for doing good (CGAP, 2010). MFIs in low income countries seem to rely a lot on subsidies and other forms of discounted financial support (Hudon and Traća, 2008).

The performance of MFIs is measured based on the social (welfare) approach in which the donor chooses an institution that best serves those most in need (Nawaz, 2010). However over time competition for donor funding has been on the increase forcing MFIs to fight for their share of funds, which resulted in a gradual shift away from the traditional approach towards a more commercially oriented one. The commercial approach however tends to lead to a diversion away from serving the real poor to a trend where financial services are provided to clients that are 'better off' (Nawaz, 2010).

There are four core activities in microfinance including savings, credit, funds transfer and insurance, which are provided to low-income households and enterprises in both urban and rural areas, including employees in the public and private sectors and the self-employed

(Robinson, 2001). Schreiner (1997) defines microfinance as the provision of affordable and accessible financial services to the poor and small scale entrepreneurs while meeting outreach, depth (measure of level of client's poverty) and breadth (measure of loan portfolio) objectives[1]. Balancing these objectives is the key challenge faced by these institutions.

Interventions by donors are important for MFIs, especially in the early stages of development, as they help speed up and effect changes that would otherwise have taken too long to happen (Hudon and Traća, 2008). Private and public donations to microfinance projects are therefore done to speed up the growth and outreach of financial services to those without access. These donations are used to support particular initiatives which are usually run by Non-Governmental Organisations (NGOs) or MFIs in areas where there is the greatest need (Ledgerwood, 1999; Hartarska, 2005; Hudon and Traća, 2008). It is for this reason that these institutions have continued to attract support through subsidies and donations, which in most cases come as soft loans and represent an investment into society. Donors, in return, like to see that the institutions they support are able to impact on poverty while being profitable and sustainable. Subsidies are also used to capitalize, improve efficiency, promote growth of newly established MFIs, and to help improve operations and performance. However, subsidies can also be a limitation for MFI productivity as the institutions struggle to balance their outreach and sustainability objectives (Balkenhol, 2007).

While donors continue to fund MFIs, the volatility in the financial markets has made it necessary to reassess their funding strategies. Studies have been done that show that there are very few MFIs that have been established without subsidies, and that the majority, especially those from SSA, have struggled to balance their outreach and sustainability objectives (Cull et al, 2006; Balkenhol, 2007; Dannroth, 2009). Despite the relative failures of some of the MFIs, funding for these institutions has continued and has generally grown rapidly over the years (Hsu, 2007). Arguably, this is because microfinance is seen as the tool that can best deliver financial services to those outside the current financial sectors and its initial success has led to the rapid development of the microfinance sector (Dannroth, 2009).

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[1] Breadth of outreach is defined as the number of savings or credit clients served by an MFI while depth is defined as the level of poverty usually measured as the number of women reached (Mersland and Strom, 2008).

Although MFIs have proved the importance in making financial services accessible to those that are excluded, questions have been raised about their relevance and adaptability under the highly dynamic financial environment as donor funding plays a crucial role in MFI growth.

1.1   Background

The outlook on microfinance is positive for sub-Saharan Africa, boosted by the sectors' ability to ride out the economic downturn relatively free of any catastrophic losses (CGAP, 2009b). This is not to say there aren't challenges that microfinance in SSA is facing. Changes in the world's economies and shortages in donor funds are proving to be a major concern. Donors, some of whom were caught up in the global financial crisis, are now paying even more attention to the activities of the institutions they are supporting. They now require improved management, transparency and better overall performance from these institutions. Furthermore competition for donor funds has been growing consistently over the years, thereby raising the pressure on MFIs to be sustainable.

This concern has culminated in a gradual increase in studies investigating the role of subsidies on the performances of MFIs worldwide (Hudon, 2006; Cull et al, 2006; Crabb, 2007; Hartarska and Nadolnyak, 2007; Hudon and Traća, 2008; 2010 and Nawaz, 2010). The challenges in microfinance have led to a series of studies on the relationship between subsidies, performance and sustainability of MFIs across the continent. Hudon and Traća (2010) showed the value of subsidies which serve as a buffer allowing MFIs to sustain operations and increase their risk profile in the early stages of development, giving them time to develop without pressures of competitors and society. However, the study also found that excessive subsidisation can be counterproductive thereby reducing efficiency, staff productivity and ethical behaviour (financial sustainability is negatively correlated to the levels of subsidies received by a MFI) (Crabb, 2007; Hudon and Traća, 2008; 2010). Other studies have intuitively tried to reduce the huge expectation on MFIs by showing that, even though microfinance has an important role to play, it must not be viewed as the only answer to the poor's unmet demand for financial services (Zeller and Meyer, 2002).

Cull et al (2006) also conducted a study of 49 MFIs worldwide to determine which factors influence their financial performances and outreach. The study revealed that subsidies formed over 20% of the MFIs' average share of funding making them important contributors as

capital injections. However an important consideration can be found in Nawaz (2010) where efficiency and productivity were found to be better contributors to self-sustainability than subsidies.

The goal for MFIs has to be to ensure a correct balance between the level of subsidy (subsidy intensity) and the revenue streams that cover operational costs (administrative costs per dollar loaned). As investors take a closer look at these elements of MFIs' operations and finances, the picture that emerges is not as discouraging as the global financial market would suggest. While the loan portfolio quality of formal institutions has generally deteriorated across regions, MFIs are demonstrating an ability to return to their operational strengths, even in countries that have been hit hard by the financial crisis. The credit crunch and the economic recession of 2007 and 2008 drove MFIs to slow down their growth. The most pressing need for MFIs in SSA is capital, with 68% of respondents reporting liquidity problems over this period, the majority of these being non deposit taking institutions (MicroBanking Bulletin, 2009). On the other hand, 44% of savings based MFIs faced the same liquidity constraints, however, these institutions were far from being immune to the effects of the crisis and reported higher levels of loan Portfolio at Risk (PAR). Seventy six percent of the savings based MFIs had an increase in the number of defaulters versus 66% for non-deposit based MFIs (MicroBanking Bulletin, 2009).

MFI administrators have proved to be prudent as they implemented measures that responded to falling portfolio quality and uncertain future funding by tightening lending standards, shrinking disbursed loan sizes, and holding more cash on hand. This may have led to a decline in the average gross loan portfolio, even though the average number of active clients has continued to grow, albeit more slowly than before, signaling that MFIs in SSA on the whole have not been drastically affected by the financial crisis (MicroBanking Bulletin, 2009).

This thesis is structured to address the general concern that microfinance and MFIs, particularly in SSA, are not profitable and are overly reliant on subsidies for their operational and financial sustainability. With this in mind the research focuses on the key issues impacting on the ability of these institutions in providing financial services to the poor while being self-sustainable. The thesis, thus, empirically investigates the determinants of MFI's performances and sustainability and analyses the effects of subsidies on them.

1.2   Conceptual framework

To understand what factors influence the performance of MFIs, Nawaz (2010) conducted a study on 179 MFIs worldwide in which indicators of financial performance were identified and assessed in order to better understand the links. Profitability, productivity, efficiency and interest rates were identified as key components of MFI's performance. Profitability is determined by revenue streams into the MFIs; revenue can be in the form of capital injections such as subsidies grants and donations, or it can be income from services provided by the MFIs in the form of interest rates on loans dispersed and also capital assets from other services provided (Ledgerwood, 1999). Productivity and efficiency affect performance by their respective costs and staff performances through factors such as location, regulation and service delivery. Interest rates charged are a key source of revenue and thereby profitability of an MFI. With this in mind the variables that are to be investigated are based on the above factors that influence a MFI's performance.

Sustainability is the ability of MFIs to raise enough revenue to cover all their costs. Yaron (1992a) identified key sustainability indicators and determined ways to analyse them. The Subsidy Dependence Index (SDI) is one such tool. In this study the Operational Self-Sufficiency (OSS) and Financial Self-Sufficiency (FSS) measures of sustainability are also used.

1.3   Problem statement

Under the current financial and economic environment it is a matter for concern if MFIs in SSA continue to rely on subsidies for their operational and financial stability. Comprehensive information on the relationship between MFIs and the role of subsidies on their performance has been limited. In many instances studies into this relationship has been done as part of broader worldwide studies. Subsidies are used to establish, capitalise and operate MFIs, of which only a few are created without them. At face value these interventions seem positive, however studies have shown that they can be counterproductive in terms of their effect on the performance, efficiency and self-sustainability of the MFIs (Hudon and Traća, 2010). Ultimately institutions and society often end up paying the price in terms of the cost of public

funds. It is for this reason that this research addresses the question of what effect, if any, subsidies have on the performance and sustainability of microfinance institutions in sub-Saharan Africa.

1.4   Objectives of the study

The main objective of the study is to analyse the effect of subsidies on the performance of microfinance institutions in sub-Saharan Africa.

 The specific objectives of this study are:

> (i) to study the effect of subsidies on the profitability of MFIs;
>
> (ii) to study the effect of subsidies on the sustainability of MFIs;
>
> (iii)to analyse the effect of subsidies on MFIs efficiency and productivity; and
>
> (iv)to highlight the role of interest rate policies in generating revenue for MFIs.

1.5   Purpose of the study

This study uses an approach developed to assess the performance of MFIs with specific focus on sub-Saharan Africa (SSA) as opposed to previous studies that have included MFIs in the sub-continent as part of broader worldwide investigations. Focussing of SSA ensures that generalised statements made previously about the sub-continent's status will become relevant to the region. Furthermore the study was conducted to bridge the information gap in the measurement of performance of MFIs in this area. This lack of information may be due to shortage of good research in the sector as well as the fact that financial information is considered propriety in most financial institutions (Hartarska, 2005), making it difficult to find studies that contain reliable financial data from MFIs in the sub-continent. Another challenge in Africa is that as the sector is highly diverse in terms of organisational types, environment and regulation, compiling comprehensive comparative reports for the continent becomes difficult.

1.6   Research methodology

This paper is designed as a contribution to the empirical knowledge and research into the effect of subsidies on MFIs in sub-Saharan Africa. The research methodology involved the use of secondary data from the Microfinance Information Exchange data base (The MIX)[2], the World Bank (WB)[3], the International Monetary Fund (IMF)[4] and Times Series Explorer (TSE)[5]. The literature review covers concepts of microfinance, microfinance institutions, donor funds and the determination of the effects of the donor funds on the performance of these institutions. Financial data from 92 MFIs in 30 African countries over three years (2006 to 2008) were sampled and econometric analyses of their financials were done.

1.7   Limitations of the study

The difficulties in doing this research were encountered when selecting and collecting the sample and data. MFIs in Africa are diverse in their cultures and methods of financial reporting, therefore getting a consistent and reliable sequence of financial data from a pool of MFIs that would satisfy the analysis requirements, proved a constant challenge. Furthermore, financial institutions do not freely divulge financial information to public spaces (as mentioned in Section 1.5) making compiling a suitable financial data base difficult.

1.8   Structure of the report

This thesis consists of five chapters. Chapter 1 is the introductory chapter which consists of the background, problem statement, research methodology and structure of the study. Also included are the research objectives, research limitations and a conclusion to summarise the chapter. The second chapter covers the literature reviewed and contains the empirical literature on microfinance in the region. This chapter also focuses on the theoretical schools of thought in microfinance and donor funding. The third chapter explains how the

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[2] The MIX is a collaborative nonprofit organisation and website established by international organizations including CGAP and SEEP NETWORK which is a database for microfinance. www.themix.org
[3] The World Bank has a data base of domestic information on all member countries worldwide
[4] The IMF is the financial wing of the World Bank Group and also has a database of country specific information
[5] TSE is an academic level data base of country economic indicators at the University of Pretoria.

performance of MFIs is measured and the variables used in the analysis. The fourth chapter presents the research methodology and the estimation techniques used. Chapter 5 presents results and findings, and chapter 6 has the summary of the findings, and conclusions with remarks and recommendations.

1.9   Summary

This study was undertaken in order to bridge the information gap on the performance of MFIs in sub-Saharan Africa. The research looks at the factors that affect the performance and sustainability of MFIs and influences their dependence on subsidies. Empirical studies reviewed show that microfinance and MFIs receive billions of dollars in funding annually from donors and agencies which are used to capitalise and establish the institutions, particularly in the early stages of development. Even though this is a social good, studies have shown that prolonged subsidisation can lead to the institutions becoming less sustainable. Furthermore MFIs have had to compete for funds as donors went through the credit crunch bringing more challenges for institutions and a need to wean themselves from their reliance of external funds.

The pressure has been growing for MFIs in SSA to outgrow their dependence on subsidies; therefore this research is aimed at understanding the effects of subsidies on these institutions taking into consideration the economic challenges faced.

Chapter 2: Literature Review

2.1 Introduction

Microfinance is a broad concept defining the supply of loans, savings, money transfers and insurance services to low-income earners. Microfinance Institutions, which encompass a wide range of financial service providers that vary in legal structure, mission, and methodology, offer these services to clients who do not have access to mainstream banks or other formal financial service providers. Microfinance has been a key strategy to assist the poor out of poverty and microfinance institutions are seen as the vehicles that can drive this strategy. It is for this reason that over the years a great deal of funds has been made available to fund the establishment, growth and maintenance of MFIs (Armendáriz et al, 2011). Furthermore, studies have been done that have shown the importance of MFIs in poverty alleviation and economic development (Von Pischke et al, 1993; Vanroose, 2008). However, there is evidence that in some settings MFIs have not been that effective in their roles (Hartarska and Nadolnyak 2007; Dannroth, 2009; Hudon and Traća, 2010). While the importance of MFIs is acknowledged, it is just as important to identify and understand the limitations that these institutions face. This chapter therefore serves as a guide to the key concepts and knowledge on the state of microfinance in SSA and the relationship between MFIs' performance, sustainability and subsidies.

2.2 Importance of microfinance to poor households

Africa still has a large percentage of the population living in poverty. According to the World Bank as much as 50.9% of the population in SSA are living on less than US$1.25 per day, as compared to South Asia where 40.4% of the population are living on the same amount (The World Bank, 2011). In these households daily living is a constant struggle, and yet somehow they are able to take part in financial activities at some point in their lives even without consistent or reliable sources of income. Savings and loans are used as a risk coping strategy by these poor households to help them overcome difficult periods. One way the poor benefit from finance is to use credit to tide them over until a subsequent income is received (Collins et al, 2009).

Not only do poor households save but they are willing to pay above market rates in order to access reliable financial services (Collins et al, 2009). When well managed the resources enable the household to engage in income generating activities, to educate and to feed themselves. For example poor households that engage in farming activities use the credit and savings to purchase inputs, while those that are landless use credit to assist the household move from a high risk existence to being economically secure and active (Collins et al, 2009).

In most cases the poor take part in financial activities through interaction in informal markets where short term loans, borrowings and savings are the main means of transacting. These transactions are carried out when funds become limited such as in the case of seasonal employment and farming, and even in the most remote areas there is always a market or informal space where people are able to trade. Some start as small market shelters but can grow to become economic hubs where millions of dollars in trading occurs daily. The Rouque Santeiro in Luanda, Angola and Idumota in Lagos, Nigeria are such examples of huge informal markets trading various commodities that bring livelihood to the poor while contributing significantly to the national economies of the countries (Hashemi et al, 2005).

Poor households need finance to help them acquire basic goods and services and to assist in overcoming consumption risks. For the poor there are two types of risk coping strategies: these are income smoothing and consumption smoothing funds (Zeller and Meyer, 2002). Poor households' smooth income by diversifying their income generating activities or by taking steps to protect themselves from income shocks, which is done through borrowing, savings and by using insurance. Microfinance facilitates access to finance for the poor households thereby raising their income levels, security and improving consumption activities. This not only has a positive effect on the household incomes but it also boosts the market thereby promoting economic development. A lack of access to financial services therefore has far extending repercussions, not only for the households, but for the economy as well. For example, without financial support a farming household fails to purchase productive and consumption goods during the non-income generating periods which ultimately affect the overall productiveness and output. Furthermore without financial support the nutritional, educational and physical states of the households are compromised (Von Pischke et al, 1993). Studies have shown that Less-Developed Countries (LDCs) have lower literacy rates and are less financially developed; thereby households in these countries tend to face more challenges

on a daily basis and the cycle of strife is perpetuated (CGAP, 2009a). Households such as those that face challenges of nutrition and literacy are therefore less productive than those with better nutrition and education.

2.3   Status of microfinance in sub-Saharan Africa

The microfinance sector in sub-Saharan Africa is a dynamic sector with thousands of MFIs and other financial service providers. Key features of MFIs in Africa are high transaction costs brought about by weak infrastructure, low population density, rural markets and high labour (administrative) costs (MicroBanking Bulletin, 2006; Armendáriz et al, 2011). Worldwide empirical studies show that microfinance has a positive impact on poverty reduction and in empowering poor households (Dewey, 2008; Hudon and Traća, 2010). Furthermore microfinance in Africa is characterised by a lack of reliable and comprehensive information about the sector.

CGAP and its partners have, over the years, published important research work on microfinance that is making huge contributions to the sector in Africa. In a 2007/2008 economic survey of the region, it was found that over these years, sub-Saharan Africa has experienced steady economic growth and accelerated progress in human development, improved infrastructure and has strengthened its policy environment. This is evidenced by the fact that in 2007 the region experienced economic growth of 6.7% (up from just over 4% the previous year) allowing the sector to capitalise on the strong growth and positive economic developments (CGAP, 2009a). To add to that, donations for MFIs in Africa improved with support from the private sector, domestic and international investors, and development agencies when compared to their counterparts in other continents.

Ghosh and van Tassel (2008) did a study that revealed that 95% of MFIs surveyed in SSA were surviving on subsidies in 2006, with only 5% being self-sustainable. However given the diversity and delivery challenges within SSA it is encouraging when survey results show that in 2007 there was a 25% growth in borrowers in microfinance reaching 4.7 million in the sub-continent. This figure reflects that financial activities for reported MFIs in Africa grew more than in the rest of the world which had an average growth in borrowers of 20% (MicroBanking Bulletin, 2008). There was also an increase in the number of savers (31%) reaching 7.2 million in 2007; the client loan portfolios grew by 69%, which was an increase

of nearly one billion US$ in dispersed loans; and savings also experienced a significant growth of 60%, reaching 1.8 million borrowers. The achievement of the majority of the MFIs was as a result of assistance from governments (public), Non-Governmental Organisations (NGO) and private firms (MicroBanking Bulletin, 2009).

Table 2.1: Benchmark indicators for MFIs in SSA, 2008

Indicator	Value (2008)	Trend
Borrowers (Millions)	6.5	⇧
Loan Portfolio (Mil. USD)	3.1	⇧
Depositors (Millions)	16.6	⇧
Deposits (Mil. USD)	2.8	⇧
Average Loan Balance (USD)	311	⇧
Average Deposit Size (USD)	96	⇩
Debt/Equity	2.3	⇔
Real Yield on Portfolio (%)	23	⇩
Operating Expenses/Assets (%)	18	⇧
Cost per Borrower (USD)	134	⇧
Portfolio at risk > 30 days (%)	4.7	⇩

Source: CGAP, 2009b

Table 1.1 shows the benchmark indicators for microfinance in sub-Saharan Africa in 2008 where the trend shows growth in the industry. According to CGAP (2009b), these MFIs fared better than traditional formal banking institutions during the financial crisis although the impact of the macroeconomic crisis was evident in the drop in average yield portfolio and average deposit sizes. Ultimately this has led donors to be more cautious in spending by closely monitoring the MFIs' activities, including portfolio quality, liquidity risk, and internal controls (CGAP, 2009b).

2.4   The role of donor interventions in economic development

Private and public donations are done through microfinance projects with the belief that MFIs can speed up the growth and outreach of financial services to those without access (Hudon and Traća, 2008). Governments therefore intervene to help the economy and specific sectors within the economy overcome the limitations to economic growth.

Public funds are funds from taxpayers used by governments and government agencies to finance development programmes for rural farmers and the poor. These funds come as grants

and loans at discounted rates (Schreiner, 2000). Grants can be in the form of gifts while discounted loans are received at below market rates by the MFI (Schreiner, 1997). Donors are not only effective in providing MFIs with funds but they also ensure more efficiency through monitoring and evaluating the institutions to ensure transparency and good governance, aimed at correct and ethical use of any donated funds.

Direct interventions in rural financial markets are done to stimulate economic growth and to reduce poverty. These interventions, although an important growth and development tool for developing countries, have generally been unsuccessful and have had a huge and sometimes negative impact on the microeconomic environment in different countries. Interventions in MFIs have been institutional in that governments establish and run development programmes and projects whose role is to ensure that the rural poor farmers can access credit they would otherwise not be able to access. The reason for establishing these initiatives is based on the fact that commercial banks generally do not provide services that are suitable or accessible to farmers, and that agriculture, though vital for developing countries, is undercapitalised (Von Pischke et al, 1993). The establishment of development banks was a way to ensure that financial services and credit became accessible to farmers; unfortunately such initiatives are extremely vulnerable to opportunistic behaviour from influential politicians, who take advantage of the cheap credit that is readily available (Schreiner, 2002).

Donors prefer to support established and already successful MFIs as they have a proven track record, further limiting growth of new institutions and the private sector in the market. For example one third of donor funding in the whole region of SSA was focussed on institutions in 5 out of 48 countries during the period under study with the largest share going to MFIs located in Western and Eastern Africa and one third going to countries such as Ethiopia, Kenya, Ghana and Uganda. Donor funding to Southern and Central Africa was the lowest, although commitments to Central Africa were on the increase while in Southern African in countries such as Namibia and Angola funding decreased significantly (MicroBanking Bulletin, 2008).

Not all donor interventions produce positive outcomes for projects as has been shown with most government funded development financial institutions. For example in South Africa the Land Bank, a rural development financial institution whose mandate is to assist farmers to access credit, has been embroiled in political disputes, financial mismanagement problems

resulting in massive losses in public funds (Barron, 2010). In Swaziland, the Swaziland Development and Credit Savings Bank, also a farmer support facility was almost liquidated because of political interference and corruption; however it was rescued by the government and has been undergoing restructuring (CBS, 2008). In Malawi, the Malawi Development Corporation (MDC) was liquidated after it collapsed under the burden of debt to the very clients it was set up to serve (PCM, 2006).

2.5   MFI performance and sustainability

Woller and Schreiner (2002) define performance as fulfilling the mission of microfinance. There are six dimensions to a MFI's performance: cost, depth, breadth (outreach), length (sustainability), scope and worth. Costs are the monetary and transactional cost of the institution and for the client; depth, as explained in the first chapter, is a measure of the clients' poverty level; breadth is the number of clients reached and length is the time measure of providing a service. Scope is the type of services that the MFI provides and worth represents the emotional dimension reflected by willingness to pay for financial services.

Sustainability is the ability to repeat performance over a long period (Hudon, 2006 and Nawaz, 2010). It is permanent but not constant, therefore for a MFI to be sustainable its organisation and structure must be flexible so that managers can adapt and adjust to the shifting economic environment (Von Pischke et al, 1993; Schreiner, 1997). A sustainable MFI should be able to meet its current goals without inhibiting its ability to meet future goals (Von Pischke et al, 1993).

Since microfinance is the provision of affordable and accessible financial service to the poor and small scale entrepreneurs, a performing MFI is one that meets its outreach and growth objectives while managing to cover all its costs. That means MFIs aim to minimise the costs and maximise the outreach and growth while being self-sustainable (Schreiner, 2002; Mersland and Strøm, 2008). This is however difficult to achieve because MFIs do not operate in optimal markets as further explained in the following section.

In a perfect market all funds are at their best use which is Pareto optimal. It is however unrealistic to expect to find such markets in reality and therefore institutions face constant

environmental challenges in that prices faced by MFIs and their clients are usually distorted because they are set through administration and not by market trends. In reality interest rates on rural loans often do not depend on the market environment but are determined through political or socially based factors. Similarly grants and subsidies are free capital funds, therefore the market for MFIs is not Pareto optimal (Schreiner, 1997), and because MFIs operate under subsidies and grants they sometimes fail to be efficient and this is a concern in terms of opportunity cost for society.

These concerns were studied by Schreiner (2002) and others (Mersland and Strøm, 2008; Hudon and Traća, 2008; 2010) to understand and analyse the cost to society and to analyse the MFIs' ability to fulfil their mandates. In this regard it is observed that there are opportunity costs attached to the use of public funds in the capitalisation of microfinance projects (Schreiner, 1997; 2000) in that MFIs are now obliged to compete for funds with other social projects, and as the prices the MFIs get are outside the market standard, it means that the true performance of the institutions is not reflected in the market trends. Donors therefore choose recipients of funding by choosing the project that has the highest benefit-cost returns (Schreiner, 1997). The opportunity cost for donors is therefore the interest rate charged on subsidised funds against the real market rate of the same loan.

2.6   The role of subsidies on MFIs performance

Understanding the role of subsidies on the performance of MFIs is a subject that has become more prominent over the years. Subsidies are below market rate prices for loans, obtained from public or private donors and entrusted to the MFIs to use in empowering the poor, and to capitalise microfinance projects and institutions. They are also used to support MFIs after they have been established and for maintaining their operational status. Subsidies can be in the form of equity grants, profit grants, revenue grants and discounted payments (Schreiner, 1997). Equity grants are subsidised funds or cash gifts that increase the worth of the MFI but do not influence the profit; these include direct cash injections from public or private donors. Profit grants are subsidised funds that are counted as revenue, and have a direct effect on, and increase the net worth of a MFI. Revenue grants are cash gifts similar to equity gifts. The fourth form of subsidy is the discounted payments which are costs that are not recorded as expenses as they are paid for by the donors (Schreiner, 1997). Subsidies have an important

bearing on performance as they can enhance the efficiency of MFIs, which, as defined by Balkenhol (2007), addresses how well MFIs allocate inputs so as to maximise output; these inputs include assets and staff to mention a few (Balkenhol, 2007). Unfortunately subsidies can also have a negative effect on MFIs by leading to corruption within the institutions and can induce market distortions (Balkenhol, 2007). To avoid the negative aspects of subsidies MFIs and donors should clearly define the conditions for the subsidy agreement which should include definitions on the level of intensity, the time period for subsidisation, transparency and accountability requirements.

Over the years studies have gradually focused on understanding the effect of subsidies on the performances of MFIs (Cull et al, 2006; Hudon and Traća, 2008; Hudon and Traća, 2010; Nawaz, 2010). Hudon and Traća (2008), analysed the impact of subsidy intensity on the efficiency of MFIs, and found that increased intensity of subsidies contributed to financial efficiency. However, protracted increases in financial aid or support were found to reduce the ability to become self-sustainable.

Subsidies distort the performance of MFIs and markets and yet they are necessary for early development of the institutions. They also lower administrative cost and the cost of funds, thus increasing the capacity to help the poor who would be least likely to be able to access credit. As stated in Zeller and Meyer (2002) "Using subsidies to assist MFIs located in the remote areas helps in the provision of financial services to a large number of the poor" (Zeller and Meyer, 2002). Hudon and Traća (2008) also noted that subsidies are a critical part in the way a MFI fulfils its role in alleviating poverty, especially in developing countries where the growth of the financial sector is very slow and economic development is stagnant.

Not all aspects of subsidies are positive, as they can lead to competitive advantage at the expense of market development. The financial sector can be exposed to a "crowding out" effect which is a major concern in the development of financial markets especially for developing countries. "Crowding out" is a concept that describes how intervention with finance packages for financial institutions can give them an advantage in terms of serving as deterrents of fair competition in the market (Nawaz, 2010). The competitive advantage that subsidies afford MFIs can lead to the emergence of monopolies in the market. Furthermore these institutions operate in markets that are underdeveloped or even nonexistent in some countries.

2.7   Evidence of link between institutional design and MFIs success

The institutional design refers to the operational strategy and structure each MFI chooses to follow in undertaking its mandate and achieving its goals (Cull et al, 2006), and can have an effect on the behaviour of the institution and ultimately on the management strategies effected. Cull et al (2006) showed that institutional design also has an effect on the profitability of the institutions, which is also in agreement with the study by Woller and Schreiner (2002). However, in a subsequent study Mersland and Strøm (2008) found that the types of ownership (shareholder owned and non-government owned MFIs) have little effect on a MFIs' performance.

Using a data set from 124 MFIs in 49 countries worldwide, Cull et al (2006) explored profitability patterns, loan repayments and cost reductions and found that reduction of cost is a key ingredient to attaining profitability. However profits can also be increased by having a suitably structured client portfolio, better client retention and improved products and services.

Interest rates are also a key component to profits for MFIs, especially those that are more commercially oriented in structure (Woller and Schreiner, 2002). According to CGAP (2009), SSA may have the second lowest financial cost globally, mainly due to high dominance of voluntary savings portfolios, but it also has extremely high operational costs. Development of a performing MFI is not only dependant on a single factor but on a balanced approach of institutional development and economic stability.

2.8   Do MFIs fulfil their mandates?

The growth of microfinance has not always yielded positive results. As the sector has grown it has, at times, gradually moved away from helping the poor to helping the less poor, with some MFIs seeking to take advantage of the more profitable commercial side of the industry (Armendáriz et al, 2011). These institutions have moved away from their traditional areas of strength, such as micro group lending, into less familiar but profitable products such as Small and Medium Enterprises (SME) lending in an effort to attract more clients, and to cover rising financial and operational costs (Hudon and Traća, 2008). With this move into new businesses an element of mission drift is noticeable in some institutions. A Women's World

17

Banking study by CGAP (2009) discovered that as MFIs transformed from NGOs into commercial entities, their average loan sizes generally grew, and the numbers of women served declined. Armendáriz et al (2011) found that mission drift is not only as a result of poor operational strategy, but of uncertainty of future subsidies.

Political interference is another factor that has led to MFIs not fulfilling their mandates, although, when institutions are not performing, political decisions can be taken that will help in improving the system. Governments have intervened in financial institutions outside their control by introducing regulations, however in most cases this is with minimal success (Yaron, 1992b; Schreiner, 1997).

2.9   Why measure subsidy?

There are three important reasons why donors need to measure subsidies. Firstly it helps in determining the various stages of development of the institutions they are funding. Secondly because there are many institutions all competing for the same limited funds, measuring subsidy allows the donors to allocate these funds to the most effective and successful MFIs. Thirdly, donations are measured so that society can monitor the effect of the projects on the welfare of the poor thus enabling donors to judge the effective and efficient use of funds donated (Schreiner, 1997).

2.10   Summary

In this chapter, literature that has looked at the role of subsidies and microfinance in general was reviewed. According to the findings and contrary to public perception the poor do save. They use savings as a coping strategy to overcome periods when income resources are limited. Microfinance is therefore important in society because it helps poor households access financial resources, which in turn assists these households overcome challenges in periods when there is no income to rely on.

The need for financial access has resulted in the rapid growth and development of the microfinance sector through MFIs. However, establishing MFIs and making finance

accessible to the poor is costly, ultimately donors are enticed to finance the establishment and development of these institutions. Subsidies are one form of financial assistance that donors use to establish and capitalise MFIs, but continued subsidisation can result in failure to attain self-sustainability and ultimately lead to poor performance.

Theoretically, delivering financial services through MFIs should reduce transaction cost and information obstacles, thereby ensuring increased accessibility for those excluded from financial activities. As Hudon and Traća, (2008) put it "donors and their donations should be used to build more inclusive financial services without creating dependence on incentives that weaken the MFI's ability to work toward being sustainable".

The literature reveals that transaction costs are high for MFIs in SSA and especially for those that serve women borrowers. The literature also shows that intervention can help MFIs overcome the early establishment limitations, and assist them through development until they are fully established and have grown their profiles, thus being beneficial to the stakeholders. However political pressures and managerial influence have led to inefficiencies within the MFIs.

The chapter concludes by looking at the factors that influence and limit MFIs from fulfilling their mandates. The section further highlights the importance and role subsidies play in the development of MFIs.

Chapter 3: Measurement of MFI Performance

3.1   Introduction

Over the years new methods of analysing MFI's performance have been developed. Academics such as Yaron (1992a) and Schreiner (1997) developed tools for analysing and determining financial performance and self-sustainability (Okumu, 2007). The older system of measuring MFI outreach was basic in comparison and involved the use of variables such as the number of loans, tons of inputs and land size, which are sometimes not readily available (Adam and Von Pischke, 1992); furthermore, some of these variables did not capture the objectives of the institutions. Over the years the measures of sustainability and performance have been enhanced, broadened, grouped and categorised into variables that are better suited for ease of analysis.

Variable selection and determination has implications in the analysis of MFI's performance. Selecting the key variables to use is a major challenge especially because important determinants can be overlooked, and by explaining variable selection and all the variables used the method of analysis can be clarified.

3.2   Framework to determine MFI performance

The literature that has been reviewed thus far has presented a picture of the relationship of microfinance and its stakeholders including the poor households, donors and governments. In this section of the chapter a framework for the analysis is established which will specify the indicators of the four key variables identified as being indicators of MFI performance in the objectives.

The performance indicators (dependent variables) used are:

- ❖ Sustainability
- ❖ Profitability
- ❖ Efficiency
- ❖ Productivity
- ❖ Real Interest Rate

Table 3.1: Indicators of MFI performance and sustainability

Performance		Sustainability
y = ç + αb where: y is the dependent variable ç is a constant b is the explanatory variable α is the magnitude of the coefficient		y = ç + αb
Indicators	**Variable of Measure**	**Measures of sustainability**
Profitability Sustainability Efficiency Productivity	Return on Assets (ROA) OSS, FSS and SDI Administrative cost per borrower Borrowers per staff	Subsidy Dependence Index (SDI) Operational self-sufficiency (OSS) Financial self-sufficiency (FSS)

3.2.1   Measures of financial viability

For any institution to be regarded as financially viable it must be able to cover its cost using its revenue. There are two levels of financial viability, namely, operational self-sufficiency and financial self-sufficiency. When an MFI is not financially self-sufficient then the SDI can be calculated to determine how revenue streams can be improved using interest rates (Ledgerwood, 1999). In this study the Subsidy Dependence Index (SDI) will be used as the proxy for long term sustainability of a MFI (Nawaz, 2010). The SDI measures the inverse of sustainability and is included in the analysis because of its relevance as an indicator of adjustments that MFIs need to make in order to become subsidy free. Also the SDI's close link to interest rate, which is a revenue source for MFIs, makes it a key contributor to performance and easier to use to measure and keep track of the required percentage increases in lending interest rates (Yaron, 1992a). Conventional financial data has limited use when trying to determine self-sustainability and the effect of subsidies on an MFI's performance. For example a SDI value of 0.265 means that the MFI has to raise interest rates charged on loans by 26.5% in order for it to become free of subsidies; alternatively a SDI value of -0.265 means that the MFI is subsidy free and can even afford to reduce its interest rates on loan by 26.5% (Nawaz, 2010). It is important that when analysing the SDI and financial reports that the analyst is aware that MFIs in different regions on the continent differ in their equity (capital) to debt (expenditure) relationships or their gearing ratios.

Profitability is determined using two key ratios, which are the Return on Assets (ROA)[6] and Return on Equity (ROE)[7].

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[6] ROA is a ratio that measures the net income earned on assets of an MFI using total assets

The two levels of self-sufficiency are Operational Self-Sufficiency (OSS)[8] and Financial Self-Sufficiency (FSS)[9]. Operational self-sufficiency is when an MFI is able to generate revenue and cover all its direct costs (operational costs, financing costs and provisions for loan loss). Financial self-sufficiency indicates a MFI's ability to cover its direct costs as well as its indirect costs (cost of capital) (Ledgerwood, 1999). When interpreting results of OSS and FSS, a MFI with values of 100 or more means that the institution is self-sufficient.

3.2.2 Efficiency and productivity

Efficiency ratios measure the cost of providing services to generate income. The costs are also known as operating costs and can be shown as efficiency ratios. The efficiency measures include average portfolio outstanding which can be administrative costs, the average of performing assets or the total of assets (Ledgerwood, 1999). Productivity is the amount of output generated using given inputs, while efficiency refers to the cost per unit output, and both these ratios can be used to determine levels of performance. Various variables can be used to measure productivity and efficiency, which include number of borrowers per staff member and administrative cost per borrower (Ledgerwood, 1999). Institutions incur various costs as they operate that have a bearing on their efficiency and productivity, which are positively and negatively influenced by the funding structure of the institution as those that are subsidised tend to have a negative effect on efficiency (Nawaz, 2010). The reason for this is that poorly performing, subsidised MFIs can continue operations with little regard for operational costs and subsidies, therefore allowing them to overlook any inefficiency in operations. This includes poor performances by employees and/or clients, making the MFIs inefficient, and it is for this reason that the administrative cost per borrower variable is identified in the framework as a proxy for a MFIs efficiency and number of borrowers per staff used as a proxy for productivity. In theory the costs are determined by the number of borrowers or clients that an MFI has, as well as the value of the loans and the number of loans or clients (Nawaz, 2010).

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[7] ROE is a ratio that indicates an MFIs rate of return on equity (Ledgerwood, 1999)
[8] Operational self-sufficiency index indicates the ability of an MFI to cover all its direct costs.
[9] Financial self-sufficiency index indicates the ability of an MFI to cover both its direct and indirect costs

3.2.3 Real interest rate

Interest rates determine the levels of access to credit, profitability of MFIs, and can mobilise the levels of deposits in an economy (CGAP, 2009b). Two schools of thought contribute to the debate on the relevance of interest rates to the performance of MFIs, these are the classical and neo-classical (Von Pischke et al, 1993). The classical view is that interest rates are determined through market forces, and in determining these no interference must occur. The neo-classical view is to use interest rates to stimulate investment without consideration of the effect on household consumption and decisions to save. When a market economy is slow to develop, governments intervene by controlling interest rate levels and providing funds at concessionary rates. This in turn creates distortions in the economy, leads to dependence on donor and government funding, and further renders MFIs vulnerable to political influence (Von Pischke et al, 1993). This view has led to the perception that poor people have negligible savings capacity because they have little or no incentive to save. Therefore we find that savings programmes are primarily aimed at the formal sector and less so for the informal sector.

In this study the real interest rate will be included in the framework because of its role in MFI's strategy in terms of earnings and management policies which has a bearing on the MFI's profitability and on interest rate policies. In the model used the real interest rate equals actual interest rate minus the rate of inflation.

3.2.4 Environment specific indicators

Microfinance institutions generally operate in developing countries under differing economic, social and political environments to achieve their goal of providing financial services to the poor. In every country, MFIs experience different challenges in terms of infrastructure, politics, economic development and human development factors. It is for this reason that variables that can account for these factors are explored, identified and included in the framework of analysis. To fully investigate the influence of subsidies on performance and sustainability of MFIs in SSA, the country specific information variables will be included in the analysis together with the MFIs' specific data. Categorical variables are used to represent the indirect and environmental effects that MFIs experience in their operations.

3.3   Explanation of variables used

Table 3.2 and 3.3 present the categorical and descriptive variables used in the study. The analysis uses data from the Microfinance Information Exchange website (the MIX). To enable the comparison of the MFIs the MIX uses financial records from thousands of MFIs across the world which are grouped into different categorical classifications. Categorical variables are used to identify a category to which an observation belongs. These variable groups are: region, lending methodology, status, other services, regulation and savings portfolio (MicroBanking Bulletin, 2010). In the regressions the categorical variables are used as dummy variables which take a specific value depending on whether a certain condition is fulfilled or not (Vijayakuma et al, 2010). Their use in two category cases is standard in an analysis. However in a case when there are more than two categories, one dummy should be excluded to serve as a reference category. The category that is excluded from the regression is called the comparison group because the estimates of the included group are interpreted with reference to the comparison group. The choice of the comparison group is left to the researcher. The categorical variables used are presented in Table 3.2. The selection of the variables is based on previously done studies by Nawaz (2010). The selection methodology is based on definitions presented by the MIX and CGAP (CGAP, 2005).

Table 3.2: Categorical variables

Variables	Description
Region	Geographic location of the MFI:
	Eastern Africa (EA)
	Southern Africa(SA)
	West Africa (WA)
	Central Africa (CA)
Lending Methodology	Classified into 3 categories:
	Individual lending (I)
	Individual and Group (IG)
	Group Lending (G)
Status	MFI classified in to 4 categories:
	Non-Governmental Organisation (NGO)
	Non-Bank Financial Intermediaries (NBFI)
	Rural bank (RB)
	Cooperative (Coop)
Savings	MFI classified into 3 categories:
	No deposit required
	Voluntary saving accounts
	Compulsory deposit accounts
Other services	MFI is classified as offers additional service or does not offer additional services
Regulated	MFI is classified as regulated by some authority or not regulated

The variable *region* is used to specify the geographical location of the MFIs which are Eastern Africa, Western Africa, Central and Southern Africa.

The second categorisation classifies the institutions according to the *lending methodology* which includes individual lending, group lending and those that combine individual and group lending methodologies.

The MIX also classifies the MFIs by *status*, which refers to the incorporation classification of the MFIs. Legally the MFIs are classified into Non-government Organisations (NGOs), Non-Bank Financial Intermediaries (NBFIs), Rural Banks (RB) and Cooperatives (Coop).

Other services is the categorisation used by the MIX to specify if an MFI provides additional services to saving and credit provision, such as technical and training programmes.

The MIX further includes the classification *regulation* to identify if a MFI is regulated or not. The final categorisation specifies the MFIs according to whether they have a *savings portfolio* or not. The MFI clients may either be required to save, or not save, or the institution may not provide savings products.

Within the categorical variables comparison groups need to be chosen (see Section 3.3.1). In the first category, *region*, Southern Africa is selected as comparison variable. In the category, *lending methodology*, individual lending is selected as the comparison variable, while NBFI is selected as the comparison variable in the *status* category. In the category *other services*, the selection can be either a yes or no option and in the category *regulation*, those MFIs that are regulated are selected as the comparison variables. Finally in the category *savings portfolio,* MFIs that offer savings was selected as the comparison variable.

3.3.1   Description of variables

There are a number of approaches to measuring MFI's performance and sustainability. In this research the selected variables are based on their role in the MFI's finances and as outlined in literature. In Table 3.3 the descriptive variables are presented. Nawaz (2010) uses an approach in which he investigates the determinants of MFI's performance basing his analysis

on Yaron's SDI measure of sustainability, and the SEEP Network's OSS and ROA as measures of self-sufficiency and profitability. The study further highlights key variables and relationships in the analysis of microfinance performance and sustainability.

Table 3.3: Description of variables used

Variables used	Unit	Description
Subsidy Dependence Index (SDI)	%	Subsidy (S)/Revenue from lending
Operational Self-Sufficiency (OSS)	%	Financial revenue (Total)/ (Financial Expense + Loan Loss Provision Expense + Operating Expense)
Financial Self-Sufficiency (OSS)	%	Financial revenue (Total)/ Adjusted (Financial Expense + Loan Loss Provision Expense + Operating Expense)
Return on Assets (ROA)	%	(Net operating Income (less taxes))/ Period average assets
Inflation	%	Consumer Price Index
Real Interest rate	%	Nominal Interest Rate – inflation
Yield/interest rate on loan	%	Revenues from loan/average of loans
MFI age	No.	Years since MFI has started operations
Loans / asset	US$	Gross Loan Portfolio/ average of assets
GNI per capita current	US$	Gross national Income divided by the population (Current US$)
GNI per capita (ppp)	US$	Gross national income divided by the population calculated by Parity purchasing power (ppp)
Financial cost	%	Interest rate paid on borrowing or debt
Financial cost/asset	US$	Interest paid on borrowing/Average of assets
Admin cost/ asset	US$	Administrative cost/ average asset
Average Loan Size	US$	Gross loan Portfolio/number of active borrowers
Loan size per GNI(ppp)		Average loan size/GNI per capita (ppp)
Loan size per GNI(current)		Average loan size/ GNI per capita
Borrowers / staff	No.	Borrowers per staff member
Women borrowers	%	Percentage of women borrowers
Admin cost per staff	UD$	Administrative cost per staff
Admin cost per borrower	US$	Administrative cost per borrower

Measures of sustainability

The Subsidy Dependence Index (SDI) is a measure of MFI's sustainability that was proposed by Yaron (1992a), and is the inverse of self-sustainability and has become a commonly used method of measuring MFI sustainability (SEEP Network, 2005). SDI is best suited for measuring the relationship between external subsidies and operating income of a MFI. In this study SDI is also used as a proxy for subsidy in the regression analysis.

SDI is expressed as:

$$SDI = \frac{S}{(LP*i)}$$

$$= \frac{(A(m-c) + ((E*m) - P) + k)}{LP*i}$$

Where;

S = Total annual Subsidy

A = the average annual outstanding concessionary loans accessed by the MFI

m = market interest rate

c = rate at which the concessionary loans have been accessed

E = equity

P = reported annual before tax profit (adjusted)

k = the sum of other grants received annually by institution

LP = the average annual outstanding loan portfolio of the institution

i = rate of interest at which the institution lends to its clients.

The Operational Self-Sufficiency (OSS) ratio is a measure of how well an MFI can cover its operational costs with its revenues (Ledgerwood, 1999; SEEP Network, 2005). OSS and FSS are measures of self-sufficiency that have been derived from a need to understand the difference between incomes received that cover operational costs and incomes from donors. Over time the methods evolved from being defined in four levels of self-sufficiency to being defined at three levels and now OSS and FSS have been refined into two levels used to differentiate them from the measurement of self-sufficiency and sustainability (Adam and Von Pischke, 1992; Ledgerwood, 1999; Okumu, 2007). The calculation of OSS varies depending on the institution, with some institutions preferring to exclude financial costs in the calculation because of the differences in the way they incur the costs. For example some institutions fund all their loans with subsidised funds and therefore have low financial costs while others don't. This would mean there would be a need for numerous ways to determine each MFIs level of sustainability which can lead to confusion (Ledgerwood, 1999). However since all MFIs incur operational costs, which need to be measured and monitored, it is

important to establish a standardised method of determining sustainability. The OSS ratio below is the method of determining a MFI's ability to contain operational costs. This ratio is relevant in this analysis as it is the basic measure of self-sufficiency for MFIs, as well as being an important index for managers of young institutions who wish to monitor the path to sustainability, as it may take several years to break even. When they do break even, they should never return to an OSS less than 100%. OSS is also suitable in that it does not tend to fluctuate as much as other ratios and a positive trend can be achieved through growth and increased efficiency. As a result, OSS is the one profitability measurement that is worth monitoring on a monthly basis and is used in this research (SEEP Network, 2005).

The numerical measure of OSS is:

$$\text{OSS} = \frac{\text{Operating Income}}{\text{(Operating expense + financial costs + provision for loan losses)}}$$

(where at least one of the variables in the formula not equal to zero).

The Financial Self-Sufficiency (FSS) ratio is calculated as an adjustment to the OSS as a result of the equity and inflationary changes (SEEP Network, 2005). FSS indicates whether enough revenue has been generated that will cover both direct and indirect costs including financial costs, provisions for loan loss, operating expenses and cost of capital. The calculation of FSS includes all financial costs, provision for losses, operating costs and cost of capital. All these variables are adjusted for the effect of inflation on the equity of the MFIs (especially in those institutions that operate with borrowed funds and subsidies). The cost of funds must be included in order to theoretically place the MFIs on par regardless of the different funding structures (Ledgerwood, 1999). The FSS is calculated using the formula below.

$$\text{FSS} = \frac{\text{Adjusted Financial Revenue (Total)}}{\text{(Adjusted Financial Expense + Adjusted Loan Loss Provision Expense + Adjusted Operating Expense)}}$$

FSS is affected by external factors such as inflation and market rates and therefore it fluctuates. It is important for managers to maintain an FSS of greater than 100% or else the sustainability of the institution is jeopardised (SEEP Network, 2005).

Measures of profitability

The Return on Assets (ROA) is an index that shows how well a MFI is managing its assets while attempting to maximise profits (SEEP Network, 2005). ROA is affected by variations in loan terms, interest rate and fees. For this reason the ROA which includes total performing assets and not only operational assets is considered. This ratio is relevant in determining the performance of a MFI because it includes the return on the loans values. The ROA equation is:

$$ROA = \frac{Net\ operating\ Income\ (less\ taxes)}{Period\ average\ assets}$$

Inflation is defined as the change in the cost of acquiring a basket of goods and services by an average consumer which is relevant in the analysis as it represents the change in the cost of goods and services in the various countries, and by using the Consumer Price Index (CPI) the effect of inflationary fluctuations is then accounted for (Ledgerwood, 1999).

The Real Interest Rate is the rate of interest that MFIs charge for loanable funds. Microfinance institutions need to ensure that the use of funds generates more revenue than the cost of funds and the interest rate is an important component in income generation and ultimately profit. Being a key determinant of profitability in MFIs the real interest rate is an important component for the analysis, and is calculated as the nominal interest rate less the inflation rate (Table 3.3) (Ledgerwood, 1999).

$$Real\ Interest\ rate = Nominal\ Interest\ rate - Inflation$$

Yield on interest rate or the effective yield is useful for MFIs to compare yield on the loans portfolio. Interest rate yield on loan measures the amount received in cash interest payments on fees and commissions from its clients. This ratio is the initial indicator of an MFI's ability

to generate cash for operations from the Gross Loan Portfolio. Interest rate yield should be analysed in the context of the local market and prevailing interest rates. Yields should not fluctuate significantly unless the MFI frequently changes its loan terms and conditions (SEEP Network, 2005). As a determinant of revenue, the interest rate yield is included in the analysis (Ledgerwood, 1999).

The yield is determined through the following equation:

$$\text{Yield} = \frac{\text{Revenues from loan}}{\text{Average of loans}}$$

Gross National Income (GNI) is defined by the World Bank as the value of products produced by citizens living within or outside the country, and in this study it is used as a proxy to measure country specific purchasing power of consumers, in other words it is a measure of the wealth of the country or region. This measure of income may not be ideal because of the high inequalities in incomes in SSA; however it is the only measure that is found in all the countries.

MFI age is a good indicator of the institution's ability to be self-sustainable. Empirical evidence shows that older MFIs are more likely to be self-sustainable and ultimately better performers than newly formed ones. The MIX uses the peer grouping characteristic to classify a MFI's age. An MFI that is 1 to 4 years old is classified as new, those between 5 and 8 years are young, and the ones over 8 years are mature (MicroBanking Bulletin, 2009). It is expected that MFIs should be self-sustainable once they reach maturity.

The Loan to asset ratio is a ratio of the gross loan portfolio over the average value of assets, and is an important indicator of performance and potential to earn revenue from its loan portfolio in the future (SEEP Network, 2005).

The Average loan size (GNI) per capita is a measure of depth of outreach. This method is used widely with variations when measuring outreach internationally when GNI per capita is used. This method poses a challenge in terms of heterogeneity within the loan products in terms of length of loan periods which should always be taken into consideration in the analysis (Okumu, 2007).

The variable women borrowers is a percentage and a measure of the number of women clients a MFI has in its portfolio. The variable is also used as a proxy for poverty in the analysis.

Measures of efficiency and productivity

Efficiency and productivity ratios provide information about the rate at which MFIs generate revenue to cover expenses (Ledgerwood, 1999). By calculating and comparing efficiency and productivity ratios MFIs can determine if they are maximising their use of resources, and the ratios can be used to compare performances of the institutions by tracking MFI staff, operating units and productivity (Ledgerwood, 1999). Efficiency ratios measure the cost of providing services to generate income, and are also known as operating costs. The efficiency measures include average portfolio outstanding which can be administrative costs, the average of performing assets or the total of assets (Ledgerwood, 1999). In this research the administrative costs per borrower ratio is used as a proxy for efficiency (Cull et al, 2006; Nawaz, 2010; Hudon and Traća, 2010).

Productivity refers to the quantities (volumes) of business that an institution is able to generate using available resources (Ledgerwood, 1999).

Productivity ratios include:
- number of active borrowers per staff (loan officer)
- portfolio outstanding per credit officer
- total loan portfolio per staff
- number of active savers per staff
- number of deposits outstanding per staff

In this research the number of active borrowers per staff ratio is used as a proxy for productivity. This variable is chosen because of its ease of determination considering that not all the MFIs in the study are similar in portfolio status. Some MFIs in the sample are deposit taking while some are strictly credit issuing institutions.

3.4   The state of the microfinance sector in sub-Saharan Africa

The categorical variables are important as they represent the economic externalities that have an impact on the regression of the descriptive variables. Figure 3.1 below depicts the status of the categorical variables used in the study and are presented graphically in pie charts.
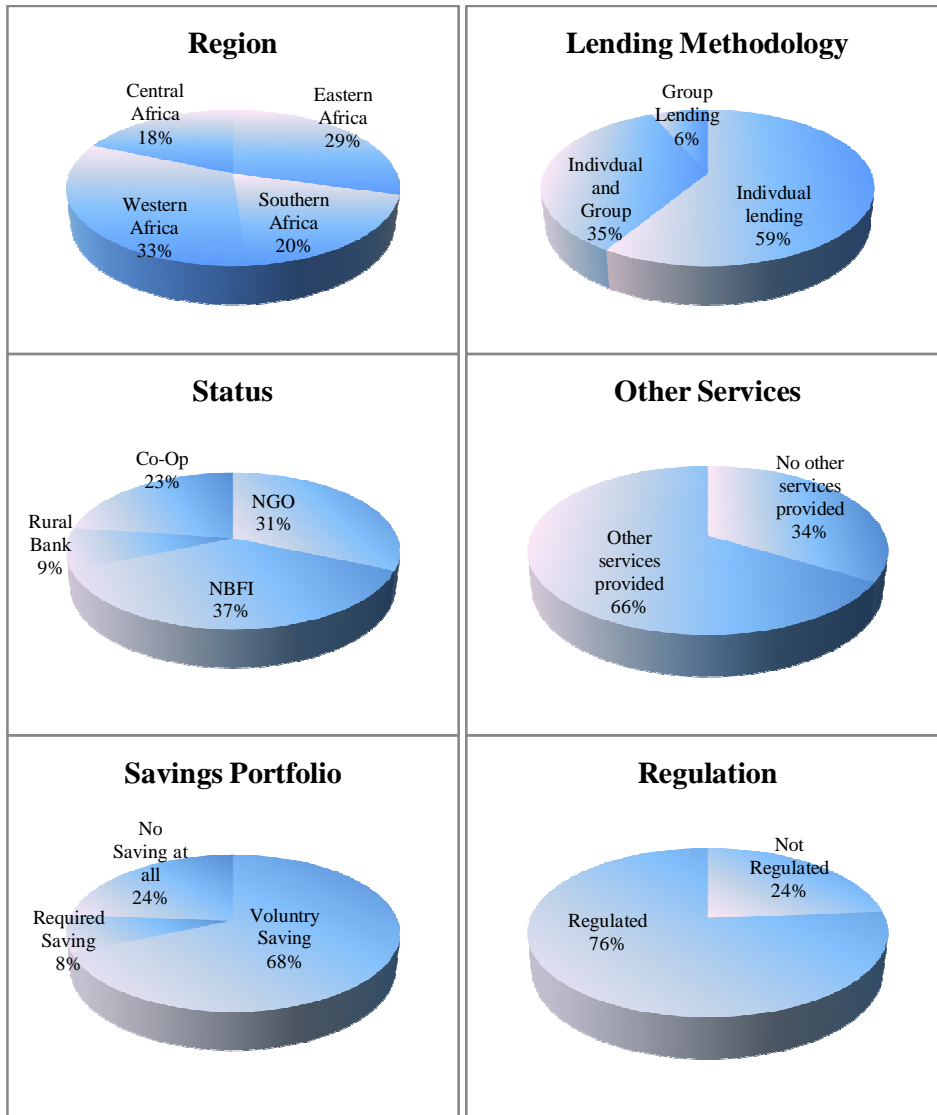
Figure 3.1: Descriptive analysis of categorical variables in SSA

Source: Data is taken from the MIX Market website based on the sample of 92 MFIs in sub-Saharan Africa (2010)

The descriptive statistics show that West Africa has the highest representation of MFIs (33%); with East Africa having the second highest at 29% and Southern and Central Africa have the least number with 20% and 18% respectively.

Individual lending in MFIs constitutes the most important form of lending with 59% of the sample. Those that combine both individual and group lending have the next highest representation (35%), while those providing group lending services only are the least represented and constitute 6% of MFIs in the continent.

NBFIs constitute the highest number of MFIs (37%) followed by NGOs (31%) according to the sample results. Cooperatives constitute 23% while rural banks are the least represented with only 9%.

Figure 3.1 also shows that 76% of the MFIs are regulated, 68% have voluntary savings products, and 66% provide additional services to their clients, such as insurance and training products.

3.5   Summary

In this chapter the determination and selection of variables that have implications for MFI's performance measurements has been highlighted. Selecting the variables to use in an analysis is a major challenge and should be done carefully, especially because important determinants can be overlooked. By explaining variable selection and all the variables used the method of analysis can be verified.

Literature reviewed thus far has shown that there is a relationship between microfinance and poverty alleviation. In the objectives a framework for analysis was established which was used to specify four key variables that were identified as being indicators of MFI performance. The indicators identified were sustainability, profitability, efficiency and productivity.

The Subsidy Dependence Index (SDI) is a measure of MFI's sustainability that was proposed by Yaron (1992a) and has become a commonly used method of measuring MFI sustainability. SDI is best suited for measuring the relationship between external subsidies

and operating income of a MFI. In this study SDI will be used as a proxy for subsidy in the regression analysis.

Successful institutions are those that are financially viable, that is, those that are able to cover their costs using revenue. There are two levels of financial viability, namely, Operational Self-Sufficiency (OSS) and Financial Self-Sufficiency (FSS). OSS ratio is a measure of how well an MFI can cover its operational costs with its revenues. FSS indicates whether enough revenue has been generated to cover both direct and indirect costs including financial costs, provisions for loan loss, operating expenses and the cost of capital. When interpreting results of OSS and FSS, a MFI with values of 100 or more means that the institution is self-sufficient.

Efficiency ratios are used to measure the cost of providing services to generate income. The costs, also known as operating costs, can be shown using efficiency ratios. The efficiency measures include average portfolio outstanding which can be administrative costs, the average of performing assets or the total of assets. Productivity is the measure of the amount of output generated using given inputs. Both these ratios can be used to determine levels of performance of MFIs.

The Return on Assets (ROA) is an index that shows how well a MFI is managing its assets while attempting to maximise profits. It is for this reason the ROA which includes total performing assets and not only operational assets is considered as a good proxy of MFI profitability.

To enable the comparison of the MFIs in differing locations the MIX groups them into different categorical classifications. Categorical variables are used to identify a category to which an observation belongs. The categorical variable groups are; region, lending methodology, status, other services, regulation and savings portfolio. In the regressions the categorical variables are used as dummy variables which take a specific value depending on whether a certain condition is fulfilled or not.

The descriptive statistics analysis showed that the majority of MFIs are located in West Africa, with East Africa having the second highest at 29% and Southern and Central Africa having the least.

Further statistics revealed that individual lending methodology was dominant in MFIs compared to those that combine both individual and group lending and those that provide group lending services only.

NBFIs were found to constitute the highest number of MFIs with NGOs being the second highest institutional form according to the sample results.

Chapter 4: Research Methodology

4.1   Introduction

Having looked at the status of microfinance in the region and discussed the various benefits and challenges of the sector, the focus is now turned to the research methodology. Chapters two and three are chapters of the literature reviewed and were used to highlight some of the key indicators of performance in MFIs. Empirical literature is limited in highlighting the functional relationship between performance and its determinants, profitability, efficiency, productivity and interest rates (Hudon and Traća, 2008, 2010; Dannroth, 2009; Nawaz, 2010).

In this chapter a quantitative approach is used with the main objective being to determine the models for analysing the effects of subsidies on the performance and sustainability of microfinance institutions in sub-Saharan Africa. The methods of data collection and analysis are explained below.

4.2   Data

This study was based on financial and macroeconomic data of MFIs in SSA which was sourced from the Microfinance Information eXchange (the MIX) website (Appendix 1, Table 1). It contains audited financial records of 92 MFIs located in 30 countries in sub-Saharan Africa, for the years 2006 to 2008. The macroeconomic indicators were obtained from the World Bank (WB), the International Monetary Fund (IMF) and Times Series Explorer (the academic level economic data base offered by academic institutions). Econometric analysis methodology was used in the study.

There were 195 MFIs in sub-Saharan Africa that submitted their records to the MIX website for analysis in 2008. This figure was an improvement from 159 MFIs in 2007 and 143 in 2006 (CGAP, 2009a). The data sample constitutes audited financial statements and reports from 92 MFIs representing 47% of the population surveyed. The sample in the study includes

institutions such as Equity Bank of Kenya, Pro-credit and FINCA in Ghana and Uganda and LAPO and WAGES in Nigeria and Togo respectively which at the time of the study were performing well.

The MFIs were selected, based on a rating system used by the MIX, in which institutions are rated according to the availability and clarity of their financial statements. The highest rating of five stars reflects good financial records whilst the lowest rating of one star reflects very poor financial records (MicroBanking Bulletin, 2009). In this study, the majority of MFIs used were those with four and five stars. However, to ensure all the regions in the continent were adequately represented, MFIs with ratings of three were also selected for the analysis, as some countries within the sample did not have MFIs with higher ratings.

Table 4.1: Summary of response of dependant variables of MFI in SSA

Performance indicator	Theoretical economic response	Expected direction in model	Expected direction in model after subsidy
ROA	+	-	-
OSS	> 100	> 100	< 100
FSS	> 100	< 100	< 100
SDI	-	+	+

Table 4.1 is a summary of the expected response of the explanatory variables in the model. The second column shows the response as stated in financial theory where ROA and the sustainability variables in a performing MFI are expected to be positive and greater than 100 while the SDI is expected to be as low as possible. The next two columns show the expected direction before and after inclusion of subsidy in the analysis, where the ROA is expected to change from positive to negative and the FSS and SDI are expected to show that MFIs in SSA are not sustainable.

4.3   Model specification

In this study, the method of analysis follows and expands on a procedure selected by Nawaz (2010). The expansion is in the introduction of subsidies as a contributing factor to MFI's sustainability and performance. The panel data random effects model was selected for use after testing for specification bias using the Hausman test. The rationale of this estimator is that it allows for the inclusion of explanatory variables that have equal values for all

observations within a group - making the inclusion of time invariant variables possible. Variations across observations are assumed to be random and uncorrelated with the independent variables in the model; therefore the random effects method accounts for the possibility of correlation within the model due to influences on the dependant variable[10] (Vijayakuma et al, 2010).

The number of observations in this study is 276 made up of the number of observations in a panel data being equal to the number of panels (*i*) multiplied by the number of time inputs (*j*).

The model for the study is therefore;

$$Y_{ij} = \alpha + \beta X_{ij} + \eta_i + \varepsilon_{ij}$$

Where:

Y represents the dependant variable i at time j

X represents the independent variable i at time j

α_i (i=1....n) represents the intercept or each entity observed

η_i represents the unobservable time invariant effect

ε_{ij} represents the within entity errors

4.4   The regressions

The regressions that follow bring about possible endogeneity of an MFI's subsidy dependence. To account for this endogeneity problem the two stage least squares regression (2SLS) is done. This is a Lagrange multiplier test of variable independence associated with time series used to test and control potential endogeneity that is found in panel regressions. The first stage regressions produce orthogonal variables that are unaffected by endogeneity of the sustainability and profitability variables. While the second stage produces the variable

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[10] All the estimations were done using STATA, an econometric analysis package

estimates. To get the second stage estimates the first stage regressions are solved using the orthogonal estimates.

The estimates in the first stage of the regression are:

SDI = 3.994 – 0.7824lnOSS

Adj R^2 = 0.1269; n= 276;

In this study the method of analysis follows a procedure selected by Nawaz (2010) who based his approach on Jacob Yaron's SDI measure of sustainability, and the SEEP Network's OSS, FSS and ROA as measures of self-sufficiency and profitability. This study augments the work mentioned in the previous sentence by doing specified regression analysis in which subsidy is gradually included in the regression equations to see its effect on the dependent variables. Each equation in the regression is therefore analysed in four regressions. The first analysis determines the direct effect of subsidy on the dependant variable. The second regression will reflect the response of the dependent variable when regressed on selected independent variables (see Table 3.3). The third regression will show the response of the dependent variable when subsidy is included in the model. The fourth and final regression in each case will reflect the response of the dependent variable when subsidy is multiplied with each of the categorical variables (dummy variables) which represent the environmental effect of the inclusion of subsidies on the performance of MFIs.

4.4.1. Profitability regression

Performance is a function of portfolio quality, productivity and efficiency, financial viability, profitability, leverage and capital adequacy and scale, outreach and growth (Ledgerwood, 1999). The focus for the regressions is on the cost to revenue relationships in the MFIs and includes yield, loan size per capita, gross national income, administration cost per asset, and the loans to assets ratios which are the independent variables. The analysis in this case controls for characteristics of the client base, including women borrowers and the age of the MFIs. The categorical variables *region, lending methodology, status, other services, regulation, and savings portfolio* are included as dummy variables. The regression is done by

monitoring the changes in explanatory variables regressed with profitability measures resulting from either including or excluding the subsidy on the right hand side of the regression equations and viewing the resulting effect on the dependent variables.

The regression model to determine the profitability of the MFI is as follows[11];

$ROA_{ij} = α + β1\ Yield_{ij} + β2\ loansize/GNIcapita_{ij} + β3\ Admn.\ Cost/asset_{ij} + β4\ loan/asset_{ij} + β5Age_{ij} + β_6Women_{ij} + β7Status_j + β8\ LendingType_j + β9Region_i + β10Savings_j + β11OtherServices_j + β12Regulated_i + ε_{ij}$ (1)

ROA as discussed in chapter 3 is a profitability indicator ratio (SEEP Network, 2005) which indicates how well a MFI is able to generate and maximise profits while managing its total assets. Since the ROA measures profitability, the independent variables used in the regression are selected so as to highlight the cost effect in the analysis (Nawaz, 2010). MFIs in sub-Saharan Africa have over the years performed poorly with some statistics showing them having negative ROA. In this analysis it is expected that ROA will also be negative showing that the MFIs are not profitable especially when subsidies are included in the analysis based on CGAP's benchmark report (2009a).

4.4.2   Sustainability regression

In the analysis of sustainability a frequency distribution is calculated using SDI values of the MFIs in the sample. This is a descriptive analysis of the SDI values which shows the distribution of the MFIs based on their levels of sustainability. A regression using OSS and FSS is then done to determine the effect of subsidies on the self sufficiency of the MFIs.

In the determination of the effect of subsidy, the regression equations are determined using the sustainability measures of a MFI's performance. These are the SDI, OSS and FSS. Equations [2], [3] and [4] are the sustainability regression equations in which the revenue variables yield interest on loans; loans per asset are regressed with the cost variables

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[11] Only time variant variables have a subscript (ij) in all the regressions

administrative cost per asset and loans size per capita GNI. The variables women and age are included in the equation due to their role as client characteristics of the MFI, while the dummy variables are included as environmental characteristics. In regression equation [3] the variables inflation and interest rates charged are included in the equation to account for their effect on the MFI's performance over time.

The Subsidy Dependence Index (SDI), as stated in the previous chapter, measures an MFI's self-sustainability indicating a long term ability to sustain its operations. It identifies measures that MFIs have to take in order for them to become free of subsidies (Yaron, 1992a). A negative SDI shows that the MFI is sustainable where a positive SDI shows it is lacking in the ability to be sustainable. For the MFIs to be performing well, the SDI should be less than zero or as low as possible. In the analysis it is expected that the SDI for the sampled MFIs will be positive showing that MFIs in sub-Saharan Africa are not sustainable over time as discussed in the literature review chapter (Table 4.1).

The Operational Self-Sufficiency (OSS) ratio identifies a MFI's ability to cover its immediate operational costs. For the MFI to be operationally self-sufficient the OSS has to be above 100%. It is expected that the average OSS for the selected MFIs will be greater than 100% in the analysis.

The regression model for estimating operational self-sufficiency is shown below;

$OSS_{ij} = \alpha + \beta1\ Yield_{ij} + \beta2\ loansize/GNIcapita_{ij} + \beta3\ Admn.\ Cost/asset_{ij} + \beta4\ loan/asset_{ij} + \beta5Age_{ij} + \beta_6Women_{ij} + \beta7Status_j + \beta8\ LendingType_j + \beta9Region_i + \beta10Savings_j + \beta11OtherServices_j + \beta12Regulated_i + \varepsilon_{ij}$ (2)

The Financial Self-Sufficiency (FSS) ratio shows whether enough revenue has been generated by a MFI to cover both direct and indirect costs including financial costs, provisions for loan loss, operating expenses and cost of capital. It is affected by external factors such as inflation and market rates and therefore it fluctuates. It is important that a FSS is greater than 100% for the MFI to be sustainable (SEEP Network, 2005). It is expected that the average FSS will be less than 100 in this analysis of the selected MFIs which is in line with regional trends.

The regression model for estimating financial self-sufficiency is shown below;

$$FSS_{ij} = \alpha + \beta1\ Yield_{ij} + \beta2\ loansize/GNIcapita_{ij} + \beta3\ Admn.\ Cost/asset_{ij} + \beta4\ loan/asset_{ij} + \beta5Age_{ij} + \beta_6Women_{ij} + \beta7Inflation_{ij} + \beta8\ Interestrate\ charged_{ij} + \beta9Region_i + \beta10Savings_j + \beta11OtherServices_j + \beta12Lending\ Type_i + \beta13Status_i + \beta14Regulated_i + \varepsilon_{ij} \qquad (3)$$

4.4.3. Efficiency regression

In the determination of the subsidy effect on efficiency of MFIs, the administrative cost per borrower variable is selected as a proxy for efficiency. Considering that the analysis is based on the cost effect of performance, the variable is seen to be a suitable proxy for efficiency. Furthermore literature shows that the same variable is used by other authors in determining MFI efficiency (Cull et al, 2007; Hudon and Traća, 2008; Nawaz, 2010; and Armendáriz et al, 2011). The analysis involves regression of the independent variables; loan size per capita GNI, GNI_{pc}, SDI, on administrative costs per borrower as the dependant variable and the different categorical variables. The results show changes in the regression outputs when the independent variables and their dummies are kept constant while changing the dependent variables, thereby monitoring the effect on the explanatory variables.

The model for estimating the effect of efficiency on performance is as follows:

$$Admincost/borrowers_{ij} = \alpha + \beta_1Loansize/GNIpc_{ij} + \beta_2SDI_{ij} + \beta_3Women_{ij} + \beta_4\ GNIpc_{ij} + \beta_5Age_{ij} + \beta_6Status_i + \beta_7Lendingtype_i + \beta_8Region_i + \beta_9Savings_i + \beta_{10}Otherservices_i + \beta_{11}Regulated_i + \varepsilon_{ij}$$

$$(4)$$

The expected effect of subsidies on the efficiency of microfinance is that it can be positive in the initial stages but with continued subsidisation it becomes negative (Nawaz, 2010). In this analysis the expectation is that the inclusion of subsidies reduces the efficiency of MFIs.

4.4.4. Productivity regression

Subsidies affect costs and productivity of staff, being investments and physical assets. In the regression the same dependent variables are therefore used to measure the effect on productivity as shown in the regression equation [5] (Nawaz, 2010).

The model for estimating the effect of productivity on performance is as follows:

$Borrowers/staff_{ij} = \alpha + \beta_1 Loansize/GNIpc_{ij} + \beta_2 SDI_{ij} + \beta_3 Women_{ij} + \beta_4 GNIpc_{ij} + \beta_5 Age_{ij} + \beta_6 Status_i + \beta_7 Lendingtype_i + \beta_8 Region_i + \beta_9 Savings_i + \beta_{10} Otherservices_i + \beta_{11} Regulated_i + \varepsilon_{ij}$

(5)

Based on the literature reviewed, an increase in the wealth of the clients leads to a decline in the staff productivity (Nawaz, 2010). This is as a result of clients getting wealthier and demanding better services. This makes it difficult for the staff to manage and meet these increased demands of their clients and thus staff productivity declines. The expected effect of the inclusion of subsidies on the productivity analysis is that it will reduce MFI staff productivity.

4.4.5. Real interest rate regression

The regression on interest rate involves using the real interest rates as the dependant variable, which is the nominal rate adjusted for inflation. The variables that are determinants of interest rate policy are cost of capital, defined by financial cost in the equation, administrative cost reflected by administrative costs per borrowers, risk which is reflected by women, inflation and profit which are defined by loan size, age and GNI per capita in the regression (Okumu, 2007). The analysis controls for characteristics of the client base including number of women borrowers, Gross National Income (GNI) per capita and average loan size. The dummy variables *region, lending methodology, status, other services, regulation, and savings portfolio* are also included.

The specific model for determining the effect of the interest rate on the performance of MFIs is as follows;

$Real\ InterestRate_{ij} = \alpha + \beta1\ loansize/GNIcapita_{ij} + \beta2\ Admn.\ Costs_{ij} + \beta3\ Women_{ij} + \beta4Age_{ij} + \beta5GNICapita_{ij} + \beta6\ Inflation_{ij} + \beta7\ FinancialCost_{ij} + \beta8Status_i + \beta9\ LendingType_i + \beta10Region_i + \beta11Savings_i + \beta12OtherServices_i + \beta13Regulated_i + \varepsilon_{ij}$ (6)

The interest rate role is twofold in the analysis. The first role is a source of revenue for the MFIs and contribution to the growth of the institution. The second role is as an inhibitor to access for the poor as high interest rates tend to inhibit entry for the poor. In the analysis the expected response is that the inclusion of subsidies will increase the interest rates charged on clients. This is because it is expected that as the subsidies take effect the cost variables, financial costs and administrative costs will increase leading to an increase in interest rates over time.

4.5   Summary

A quantitative approach was used in the research methodology. There were 92 MFIs from 30 countries in SSA whose audited financial records were analysed using the panel data estimation technique. Four sets of regression models were established as those that could best explain the effects of subsidies on the MFI's performance and sustainability. These were the profitability regression, the efficiency, productivity regression and the real interest rate regressions.

The method of analysis followed was a procedure selected by Nawaz (2010). The methodology was expanded by introducing subsidies as a contributing variable to MFI's sustainability and performance indicators. Regression models were established so that regressions on specific variables could be carried out. The profitability regression of the MFI was determined using the ROA while the sustainability regressions were determined using SDI, OSS and FSS which were identified as the best indicators of self-sustainability and profitability.

The administrative cost per borrower ratio was selected as a proxy for efficiency. The number of borrowers per staff ratio was selected as the proxy for productivity. The interest rates regression model was done because it has a bearing on the MFI's profitability potential and on interest rate policies.

The average loan size per GNI, per capita and number of women borrowers were selected as proxies for measuring depth of outreach and poverty.

The expectation from the findings in this paper are that while MFIs are expected to be operationally self-sufficient, as will be reflected by the OSS, they on average neither profitable nor are they expected to be self-sustainable and efficient as shown in the summary Table 4.1. With the development of the right regressions the results will prove to be in line with *a priori* expectations for the industry.

Chapter 5: Analysis and Findings

5.1   Introduction

This study draws on previous studies whose focus was to highlight the concerns around MFIs being subsidy dependent. This research focuses on the effect of subsidies on the performance and sustainability of MFIs in sub-Saharan Africa and highlights the difficulties that the African sub-continent faces in terms of efficiency, productivity and balancing of outreach and sustainability objectives.

The focus in this chapter is to carry out the analysis and interpret the results. The regressions were carried out by employing OLS panel analysis for the 92 MFIs that were populated over the years 2006 to 2008. This chapter is divided into the following sections: introduction; discussion of the summary findings focusing on the correlation output as shown in Appendix 1, Table 2; the discussion of the results of the regressions and the summary of the chapter. Appendix 1 is a full list of the institutions used in the study and their countries of origin. Appendix 1, Table 3 is the complete table of summary statistics.

5.2   Summary findings

Table 5.1 shows the summary results of the variables used in the study. These variables are defined in Chapter 3 in line with the definitions used by the MIX and CGAP (Hashemi et al, 2005). The summary results reveal that on average, microfinance institutions in sub-Saharan Africa have a SDI that is 0.396 (39.6%) and a FSS that is 74.32%. MFIs in Africa face higher transaction costs and lower average revenue streams than their counterparts in other parts of the world which lends support to why these MFIs have lower financial self-sufficiency values. The positive sign of the coefficient of the SDI shows that the MFIs need to raise interest rate charges by 39.6% in order for the average institution to become subsidy free. However the minimum value of -2.53 shows that there are institutions, such as Capitec in South Africa, SEAP in Nigeria, Equity Bank and K-Rep in Kenya, that are self-sustainable.

Table 5.1: Summary statistics for MFI in sub-Saharan Africa (2006-2008)

Variables used	Unit	Description	Obs	Mean	Std Dev	Min	Max	World mean^^
Subsidy Dependence Index (SDI)		Subsidy (S)/Loan Portfolio * interest (LP*i)	276	39.6	1.16	-2.53	1.812	21.4
Operational Self-Sufficiency (OSS)	%	Financial revenue (Total)/ (Financial Expense + Loan Loss Provision Expense + Operating Expense)	276	136.01	504.84	4.50	847.30	123.0
Financial Self-Sufficiency (FSS)	%	Adj Financial revenue (Total)/ (Adj Financial Expense + Adj Loan Loss Provision Expense + Adj Operating Expense)	276	74.32	108.51	-419.33*	153.79	105.1
Return on Assets (ROA)	%	(Net operating Income (less taxes))/ Period average assets	276	-1.48	13.58	-85.07	20.48	5.26
Inflation	%	Consumer Price Index	276	10.78	8.47	-8.97*	44.39	6.6
Real Interest rate	%	Nominal Interest Rate – inflation	276	16.74	9.38	-17.2	32.27	24.0
Yield/interest rate on loan	%	Revenues from loan/average of loans	276	40.27	25.56	0.23	147.98	30.6
MFI age	No.	Years since MFI has started operations	276	11.3	7.13	0.00*	40.0	14.15
Loans / asset	US$	Gross Loan Portfolio/ average of assets	276	7.5	0.22	0.01	15.2	9.4
GNI per capita current	US$	Gross national Income divided by the population (Current US$)	276	713.51	920.69	110.00	5820.0	1358
GNI per capita (ppp)	US$	Gross national income divided by the population calculated by Parity purchasing power (ppp)	276	1494.30	1446.22	278.76	9780.0	3476
Financial cost	%	Interest rate paid on borrowing or debt	276	16.83	8.98	0.02	47.0	7.30
Financial cost/asset	US$	Interest paid on borrowing/Average of assets	276	0.18	1.06	0.00	10.10	0.028
Admin cost/ asset	US$	Administrative cost/ average asset	276	0.211	14.24	0.00	31.83	0.176
Average Loan Size	US$	Gross loan Portfolio/number of active borrowers	276	515.23	736.41	2.37	6381.6	808
Loan size per GNI(ppp)		Average loan size/GNI per capita (ppp)	276	0.516	48.87	0.00	62.723	0.309
Borrowers / staff	No.	Borrowers per staff member	276	179.14	297.31	0.07	4036.0	143
Women borrowers	%	Percentage of women borrowers	276	62.74	25.64	1.37	100.00	64.07
Admin cost per staff	UD$	Administrative cost per staff	276	5672.20	4099.25	277.1	33972.	12166
Admin cost per borrower	US$	Administrative cost per borrower	276	154.82	313.68	0.19	6081.	131.09

Source: The table of variables used in the analysis is based on the authors own calculations (2010).
* Outlier variables are not considered.
^^ values taken from analysis by MicroBanking Bulletin (2008) and Nawaz (2010).

The results also show that MFIs in the region are operationally self-sufficient, meaning that the majority of MFIs in SSA are able to cover their direct costs with revenues received. The average for OSS in SSA is 136.01% and when looking at the yield return on loans the figure shows that on average these MFIs charge interest rates of 40%. The findings however reflect that on average MFIs in SSA have a negative ROA (-1.48) and are therefore not profitable. These results support the findings by CGAP (2010) in which the average ROA for MFIs in

SSA was -1.8 for the similar period, a trend that may be caused by high transaction costs and institutional inefficiencies.

The summary statistics also show that on average MFIs in SSA were found to be 11 years and three months old making their average age to be 3 years younger than that of MFIs in the rest of the world. However, in considering the definition of the stages of institutional growth as explained in chapter 3, it can then be concluded that MFIs in SSA are on average mature.

Countries in sub-Saharan Africa have on average lower incomes than those in the rest of the world. This can be seen in the lower average per capita GNI values where African MFIs have a mean of US$ 1 494.3, compared to the world average of US$ 3 476.00. This information is unsurprising added to the fact that the average loan size is lower for MFIs in Africa (US$ 515.23) than for those in the rest of the world which is US$ 808.00.

The average number of borrowers per staff is 179 clients to a staff member according to the summary findings, which is much higher than the world average of 143, implying that MFIs in SSA are less productive than those in the rest of the world.

Similarly, MFIs in SSA were found to be on average less efficient than MFIs in the rest of the world shown by the mean values of the administrative costs per borrower, which proves that generally costs are higher when serving borrowers in Africa than in other continents.

MFIs in SSA charge borrowers an average interest rate of 40.27% yet it costs them 16.83% to acquire loanable funds, whereas on average MFIs in the rest of the world charge interest rates of 30.6% and pay 7.3% to acquire loanable funds, highlighting the fact that funding of loans is costly on the African continent.

Financial costs (loanable funds) are high in MFIs in SSA with the average at 16.83%. This has resulted in more and more MFIs focusing on mobilising deposit accounts to fund their equity base.

The administrative costs for staff are lower in SSA compared to MFIs in other parts of the world because of the lower average wage rates for MFIs in Africa (MicroBanking Bulletin, 2008).

Administrative costs per borrower are higher in SSA because MFIs in this part of the world operate in rural markets serving clients in sparsely populated countries. The average value of administrative costs per borrower is US$ 153.82 compared to the world average of US$ 131.09.

5.2.1 Measuring MFI performance and sustainability

The correlation matrix as presented in Table 2 in the Appendix shows the strengths of the relationships between selected variables of importance. The SDI has a negative and significant relationship with ROA, Age of the MFI and inflation, implying that subsidies reduce a MFI's profitability and older MFIs are more sustainable. The SDI is also significant and positively related to the average loan size, number of women borrowers and administrative costs per borrower implying that an increase in costs, directly or through increased outreach and poor clients, reduces the MFI's sustainability. The correlation also shows that older MFIs have lower interest rate costs to pay.

OSS is positive and significantly related to FSS, showing a strong relationship between the MFI's ability to cover their operational and indirect costs. This correlation implies that financial self-sufficiency can be attained once operational self-sufficiency is reached.

FSS is significant and negatively related to inflation showing that inflation reduces an institution's ability to cover its indirect financial costs, highlighting how environmental factors can affect a MFI's sustainability. MFIs in countries with high inflation will therefore struggle to attain financial self-sufficiency.

The profitability indicator, ROA is significant and negatively related to the real interest rate and financial costs, showing that an increase in the interest rate cost and the cost of loanable funds reduces profitability, while the continuous increase in interest rate charges ultimately leads to a fall in profitability as clients default due to the high cost of funds.

The interest rate charged is significant and negatively related with the average loan size per GNIpc (outreach). It has a positive relationship with GNI per capita (wealth), women (poverty), administrative costs per staff (efficiency) and financial costs (cost of loanable

funds). The positive relationship shows that interest rate charges are higher in countries with higher income levels where it is expected that administrative costs and clients' incomes are higher.

The correlation also shows that MFIs with stronger outreach programs tend to have higher costs in Africa, as well as the fact that high financial costs tend to reduce the number of poor clients, who in most cases are women.

5.3   Regression results

In analysing the results four specified regression analyses are done for each regression equation as shown in the Tables 5.2 to 5.8. The first analysis determines the direct effect of subsidy on the dependant variable. The second regression will reflect the response of the dependent variable when regressed on selected independent variables. The third regression will show the response of the dependent variable when subsidy is included in the model. The fourth and final regression in each case will reflect the response of the dependent variable when subsidy is multiplied with each of the categorical variables (dummy variables) which represent the effect in assessing any possible combined effects of these variables on performance indicators.

5.3.1   Profitability regression

In the first regression, the effects of subsidies on the profitability model, is done using Return on Assets (ROA) as a dependent variable. ROA is a ratio used to indicate how well a MFI is using its assets to generate revenue to be profitable. The benefit of using the ROA is that it includes revenues earned through all channels including operations, investments and portfolio. According to the SEEP Network (2005) if the ROA is constant it can be used to forecast future earnings as well. It is also favourable because it measures profitability regardless of the institutions funding structure, be it through equity or other forms of funding, making it a good ratio to compare institutions. The ROA which is used as the proxy for profitability should be positive and high for MFIs to maintain a large percentage of assets in the gross loan portfolio. The independent variables selected in the regression equation include

those that generate revenue for the MFIs including yield on interest on loans and loan size per GNI$_{pc}$. The cost variables are administrative costs per asset and percentage women while the performance and asset growth variables are loans per asset and the age of the MFI. The regression model for determining the effect of subsidy on the profitability of a MFI is specified in chapter 4 as regression equation [1].

Table 5.2: Profitability regressions

Variables	Dependent variable DIRECT EFFECT ROA/Subsidy [1]		ROA / Dependent variable Without subsidy [2]		ROA/Dependent variable with subsidy [3]		ROA multiplied with dummies multiplied by subsidy [4]	
ROA	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
SDI	-0.055	0.443	-	-	0.341	0.630		
Yield interest on loans			0.028	0.038	0.030	0.038	0.026	0.036
Loan size/GNIpc$_{ppp}$			-0.086	0.689	-0.143	0.699	0.277	0.666
Admin Cost/Asset			-4.219 ***	0.793	-4.211***	0.796	-4.155***	0.756
Loan/Asset			1.238	1.293	1.934	1.829	1.881	1.809
Women Borrowers			0.040	0.037	0.037	0.038	0.005	0.036
MFI age								
Young			2.603	2.585	2.643	2.591	1.454	2.524
Mature			5.672**	2.772	5.740**	2.781	4.631*	2.676
Region							-1.009	1.533
East Africa			-2.71	3.916	-2.663	3.934		
West Africa			-2.968	4.295	-3.084	4.317		
Central Africa			5.654*	3.443	5.600	3.459		
Lending methodology							2.270	2.921
Individual & Group			-1.279	5.276	-1.278	5.297		
Group			-1.936	5.272	-1.832	5.297		
Status							4.452**	2.274
NGO			-10.614***	4.285	-10.719**	4.306		
Cooperative			6.396	5.245	6.277	5.270		
Rural Bank			-0.448	3.695	-0.621	3.722		
Savings Portfolio							0.525	1.843
Required Saving			-5.192*	3.184	-5.143	3.198		
No Saving			-1.934	5.403	-2.042	5.428		
Other services provided			-1.492	2.633	-1.514	2.644	3.696	3.288
Regulated			-4.823	3.459	-4.742	3.477	-12.055***	3.775
R Square	0.0091		0.2989		0.2996		0.2347	
Wald chi2 (1)	(1.92)		56.67		56.63		56.63	
Prob >	0.1143		0.0000		0.0000		0.0000	

Source: Authors calculations based on data taken from audit reports of the Mix Market website. * represents the level of significance. *significant at 10%; ** significant at 5%; *** significant at 1%.

The results of the regressions are presented as the four estimations of specification shown in Table 5.2. The R^2 shows that 30% of the variations in profitability in regression specifications [2] and [3] are explained by variables included in the model. However in the case where subsidy is multiplied by the dummies, the model shows that only 23% of the variations in profitability are explained by the variables used, showing that the variables are not strong indicators of profitability among those that were available for analysis.

Subsidy determined through the proxy SDI has no direct effect on MFI's profitability as seen in regression specifications [1] and [3], however the administrative costs to assets variable has a negative and significant relationship with profitability. This shows that a 1% increase in administrative costs results in a 4.2% chance of a decline in profitability. The negative effect is as expected as the average ROA for these MFIs was found to be -1.48% in the summary statistics (Table 5.1). The results are also supported by literature that shows that in the period of study the means of ROA in the sub-continent were negative (MBB, 2009; CGAP, 2010).

The variable age of the MFIs is significant and has a positive relationship with ROA showing that the older the institution the more likely it is to be profitable. Regression specification [2] shows that a 1% increase in the age of an MFI increases the profitability of the institution by 5.7%. However, the inclusion of subsidy in the regression results in older MFIs becoming less profitable than before they were subsidised.

The variable *status* is significant when analyzing its effect on a MFI's profitability. The results show that when a MFI is a NGO the chances of being profitable are significantly reduced. Therefore one can conclude that NGOs are less likely to be profitable when compared with NBFIs.

The finding on the variable regulation shows that the inclusion of subsidies in the finance of regulated MFIs leads to a decline in the profit levels. This can be seen in the regression results which show that every percent increase in subsidy to regulated MFI leads to a negative 12.05% decline in profitability. This is an important finding as it shows a clear link between increases in subsidies and the reduction of profitability levels of institutions. The cause for such huge variations could lie in the regulations themselves. Empirical studies found that costs associated with regulated MFIs are much lower than costs incurred by those that are unregulated (MicroBanking Bulletin, 2008). Furthermore the findings raise important questions pertaining to the need for increased regulation which benefits institutions through increased investor confidence and improved client retention brought about by the security of regulations.

5.3.2 Analysis of sustainability

Sustainability, just like profitability, is an indicator of MFI performance. Sustainability is measured with three key ratios: SDI, OSS and FSS. In the analysis a frequency distribution is determined to establish the distribution according to levels of sustainability of the MFIs in the sample.

Table 5.3: Frequency distribution of sustainable MFIs in SSA

MFI sustainability	Number	Percentage
MFI that are not sustainable	249	90.22
MFI that are sustainable	27	9.78
Total	276	100

Table 5.3 shows the frequency distribution of sustainable MFIs in SSA. The findings show that of the 276 MFIs in the sample, 90.22% are not sustainable while only 9.78% were found to be sustainable. This is a significant finding as it supports the expected outcome that the majority of MFIs in the Africansub-continent are not sustainable (Ghosh and Van Tassel, 2008).

5.3.2.1 Operational self-sufficiency (OSS) regression

The OSS in essence shows the ability of MFIs to cover their operational costs, excluding the cost of capital, even after they have stopped receiving subsidies. This can be done by increasing revenue, growing the gross loan portfolio or by mobilising deposits to finance their loans instead of relying on financing from investors and subsidies. The majority of MFIs have strong deposits (68% voluntary savings portfolio) as shown in Figure 3.1. Table 5.4 shows the results of regression equation [3].

Table 5.4: Operational self-sufficiency regressions

Variables	Dependent variable DIRECT EFFECT OSS/Subsidy [5]		OSS to Dependent variables without subsidy [6]		OSS to Dependent variable with subsidy [7]		OSS multiplied with Dummies and subsidy [8]	
OSS	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
SDI	-0.148***	0.023	-	-	-0.029	0.028		
Yield interest on loans			0.006***	0.001	0.006***	0.001	0.006***	0.001
Loan size/GNIpc$_{ppp}$			-0.0003	0.024	0.002	0.025	0.008	0.024
Admin Cost/Asset			-0.171***	0.024	-0.172***	0.025	-0.168***	0.024
Loan/Asset			0.491***	0.056	0.437***	0.076	0.421***	0.077
Women Borrowers			0.002	0.001	0.002	0.001	0.001	0.001
Interest rate charged			0.001	0.004	0.001	0.004	0.001	0.004
MFI age								
Young			0.363***	0.096	0.360***	0.096	0.366***	0.095
Mature			0.481***	0.091	0.473***	0.091	0.477***	0.089
Region							0.021	0.056
East Africa			0.063	0.103	0.059	0.103		
West Africa			0.049	0.118	0.059	0.118		
Central Africa			0.110	0.091	0.115	0.091		
Lending methodology							-0.146	0.102
Individual & Group			0.088	0.139	0.086	0.139		
Group			0.053	0.139	0.045	0.139		
Status							0.178**	0.076
NGO			-0.430***	0.116	-0.424***	0.117		
Cooperative			-0.092	0.139	-0.083	0.139		
Rural Bank			-0.246***	0.099	-0.233***	0.099		
Savings Portfolio							-0.025	0.063
Required Saving			0.006	0.085	0.001	0.085		
No Saving			0.008	0.143	0.016	0.143		
Other services provided			-0.107	0.070	-0.103	0.070	-0.088	0.113
Regulated			-0.056	0.092	-0.061	0.092	-0.186	0.134
R Square	0.1300		0.5110		0.5141		0.4678	
Wald chi2 (1)	(42.11)		211.10		212.19		189.01	
Prob >	0.0000		0.0000		0.0000		0.0000	

Source: Authors calculations based on data taken from audit reports of the Mix Market website. * represents the level of significance. *significant at 10%; ** significant at 5%; *** significant at 1%.

The R^2, in the regression specifications [6] and [7], shows that 51% of variation in OSS is explained by the variables used in the model. Regression specification [8] however shows that only 47% of the variation in OSS is explained by the variables used in the model. Regression specification [5] presents the direct effect of subsidies on the dependant variable OSS. The findings show that subsidy is significant (at the 1% level) and negatively related to OSS with a magnitude of -0.148. This result indicates that a 1% increase in subsidy leads to a 0.15% decline in the MFI's operational self-sufficiency implying that subsidised MFIs are less likely to be operationally self-sufficient and therefore unlikely to be self-sustainable as well.

The variable yield interest on loan, administrative costs per asset, loan per asset, MFI age and MFI status are significant in the regressions [6], [7] and [8]. The results reflect that the yield interest on loans is significant (at the 1% level) and positively related to OSS showing that an increase in revenue also increases the ability for the MFI to cover its operational costs,

thereby improving its performance. The inclusion of subsidies in the regression has a positive and significant effect on OSS as seen in the regressions [7] and [8]. The magnitudes of the coefficients are however very small indicating that subsidy has very small effect on the revenue streams of MFIs.

The variable administrative cost per asset is negatively related to OSS reducing the potential for MFIs in SSA to be operationally self-sufficient. This is because increases in administrative costs lead to a reduction in the operational self-sufficiency measures. The inclusion of subsidy in the administrative cost regression [8] has no noticeable effect on OSS.

Subsidies however have an effect on the magnitude of the loan to assets ratio as an increase in the ratio leads to an increase in the OSS, showing that MFIs in SSA are able to generate enough revenue from their loan portfolios to cover their operational costs. The inclusion of subsidy however reduces the magnitude of the OSS showing the negative effect subsidies have on sustainability.

The regression on age of the MFI shows that both young and mature MFIs have a positive and significant relation with OSS. Self-sufficiency, and ultimately sustainability is improved with increased age, as seen in the positive coefficients, implying that older institutions are more likely to be operationally self-sufficient than those that are in the nascent phase of development. The inclusion of subsidies in these analyses yields no significant change in the results as shown in the regressions [7] and [8].

Non-Bank Financial Institutions (NBFIs) are more self-sustainable than other forms of institutions. The findings show that NGOs and Rural Banks are less likely to be self-sufficient when compared to NBFIs.

5.3.2.2 Financial self-sufficiency (FSS) regression

Financial self-sufficiency measures the performance of MFIs taking into consideration inflation, cost of loan provision, and subsidy among other expenses (Yaron and Manos, 2007). It is a ratio developed to evaluate the level of subsidy dependence and to monitor the ability of MFIs to cover operational and indirect costs, including financial costs, provision for

losses, operating costs and cost of capital, over time in their progress toward self-sustainability.

Table 5.5: Financial self-sufficiency regressions

Variables	Dependent variable DIRECT EFFECT FSS/Subsidy [9]		FSS to Dependent variables without subsidy [10]		FSS to Dependent variable with subsidy [11]		FSS multiplied with dummies and subsidy [12]	
FSS	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
SDI	-0.092**	0.048			-0.020	0.053		
Yield interest on loans			0.003	0.002	0.003	0.002	0.003	0.002
Loan size/GNIpc$_{PPP}$			0.033	0.041	0.034	0.041	0.042	0.039
Admin Cost/Asset			-0.136***	0.039	-0.137***	0.039	-0.137***	0.038
Loan/Asset			0.363***	0.104	0.330**	0.137	0.273**	0.136
Women Borrowers			0.005**	0.002	0.005**	0.002	0.004*	0.002
Inflation			-0.068***	0.007	-0.067***	0.007	-0.073***	0.006
Interest rate Charged			-0.011	0.007	-0.010	0.007	-0.010	0.007
MFI age								
Young			0.417***	0.163	0.414***	0.163	0.422***	0.160
Mature			0.567***	0.145	0.561***	0.146	0.594***	0.140
Region							0.042	0.091
East Africa			-0.256	0.163	-0.259	0.163		
West Africa			-0.205	0.179	-0.198	0.180		
Central Africa			-0.071	0.135	-0.067	0.135		
Lending methodology							-0.215	0.164
Individual & Group			0.107	0.208	0.108	0.209		
Group			0.177	0.206	0.172	0.207		
Status							0.202*	0.120
NGO			-0.453***	0.179	-0.449**	0.180		
Cooperative			-0.140	0.211	-0.136	0.212		
Rural Bank			-0.285*	0.155	-0.277*	0.157		
Savings Portfolio							-0.034	0.099
Required Saving			0.042	0.126	0.039	0.127		
No Saving			0.033	0.212	0.040	0.213		
Other services provided			-0.146	0.106	-0.143	0.107	-0.128	0.180
Regulated			0.032	0.137	0.029	0.137	-0.177	0.216
R Square	0.0139		0.4903		0.4906		0.4612	
Wald chi2 (1)	(3.76)		237.70		236.37		213.86	
Prob >	0.0525		0.0000		0.00000		0.0000	

Source: Authors calculations based on data taken from audit reports of the Mix Market website. * represents the level of significance. *significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5.5 presents the regression results for the FSS which reveal the R^2 as 0.49, which means that 49% of the variation in FSS is explained by the variables in the model. Regression specification [9] shows a negative and significant (5%) relationship between FSS and subsidy, indicating that an increase in subsidies results in a decrease in the FSS showing the negative effect subsidies have on the financial self-sufficiency of MFIs.

The results of regression [10] show that administrative cost per asset, loans per asset, inflation, age, and *status* have a significant relation with the FSS. Administrative cost per asset is negative and significant showing that a 1% unit increase in administrative cost results in a 0.14% decline in financial self-sufficiency. The inclusion of subsidies in the regressions yields no significant changes to the magnitudes and signs of the coefficients.

The loan to assets variable has a positive and significant relationship with FSS. In this case the findings show that a 1% increase in the loans to assets ratio results in a 0.36% increase in the FSS, implying that by sufficiently growing their loans portfolios, MFIs can generate enough revenue to make them financially self-sufficient. The inclusion of subsidies in regression specifications [11] and [12] result in changes in the coefficients as there is a decline in the magnitudes to 0.33% and 0.27% respectively, revealing that the inclusion of subsidies can lead to marginal reductions in the loan portfolios, which in turn leads to a decline in the MFI's ability to be financial self-sufficient.

The regression of the variable percentage women borrowers shows that increasing the number of women clients can enable the MFIs to be FSS. The magnitudes are however very small at 0.004% and once again the inclusion of subsidies yields no significant effect on the regression as seen in equations [11] and [12]. The output is expected because as discussed in the regression results above an increase in the portfolio should result in a better FSS. This finding can further be supported by the observation that women borrowers and poorer clients are more reliable in repaying loans thus ensuring the financial stability of the institutions (Hudon and Traća, 2008; Collins et al, 2009).

Inflation is significant and shows a negative relation to FSS reflecting that a unit change in the inflation results in a 0.067% decline in the FSS. This change is small but relevant in that the signs show that increases in costs due to increased prices (inflation) leads to a decline in the MFI's ability to be financially self-sufficient. The inclusion of the subsidy variable in the regressions does not yield significant changes in the results; however, regression specification [12] shows that inflation had a slightly bigger and negative impact on the financial self-sufficiency of subsidised MFIs than in those that are not subsidised.

The variable age of the MFI is significant and positively related to FSS. The regression results show that an increase in the age of MFIs results in a 0.42% increase in their financial self-sufficiency thus verifying that older institutions are more likely to be financially self-sufficient than younger institutions. In regression [11] and [12] the subsidy is included in the regression and the results show a small variation in the magnitude of the MFI's coefficient for age. This variation although small shows that subsidies have a positive impact on MFIs as they mature.

The results also show that NGOs are less likely to be FSS than NBFIs and to a lesser extent Rural Banks fall into the same category. In our sample the majority of MFIs are NBFIs (37%) which shows that this business model is already the preferred institutional form on the continent. It can therefore be said that the differences in institutional forms and strategies have an impact on the performances of MFIs as expected.

5.3.2.3 Efficiency regression

Efficiency is a key performance indicator and identifying the levels of efficiency is important in the monitoring of performances of MFIs. The variable administrative cost per borrower is used as the proxy for efficiency in the regression. The R^2 is 0.43 and increases to 0.51 with the inclusion of subsidy, showing that 43% of the variation in efficiency is explained by the model.

Table 5.6: Efficiency regressions

Variables	Dependent variable DIRECT EFFECT Admin cost per borrowers /Subsidy [13]		Administrative costs per borrower/ without subsidy [14]		Administrative costs per borrower/ with subsidy [15]		Administrative costs per borrower/ Dummies multiplied by subsidy [16]	
Administrative costs per Borrower	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
SDI	0.265***	0.025	-	-	0.260***	0.025		
Loan size/GNIpc$_{ppp}$			0.270***	0.051	0.192***	0.043	0.217***	0.043
Women Borrowers			0.006**	0.003	0.001	0.002	-0.001	0.002
GNIpc$_{ppp}$			0.343*	0.187	0.461***	0.173	0.706***	0.169
MFI age								
Young			-0.357*	0.192	-0.291**	0.161	-0.315*	0.164
Mature			-0.254	0.216	-0.142	0.185	-0.216	0.187
Region							-0.135	0.101
East Africa			-0.895***	0.338	-0.835***	0.320		
West Africa			0.171	0.356	0.101	0.336		
Central Africa			-0.268	0.299	-0.267	0.283		
Lending methodology							-0.129	0.197
Individual & Group			-0.426	0.470	-0.431	0.445		
Group			-0.285	0.459	-0.245	0.435		
Status							-0.083	0.159
NGO			0.961***	0.367	0.963***	0.345		
Cooperative			0.462	0.448	0.404	0.424		
Rural Bank			0.365	0.313	0.412	0.296		
Savings Portfolio							0.089	0.122
Required Saving			-0.258	0.274	-0.293	0.259		
No Saving			-0.099	0.464	-0.258	0.439		
Other services provided			0.377*	0.229	0.317	0.216	0.273	0.223
Regulated			-0.542	0.298	-0.519*	0.283	0.273	0.253
R Square	0.1297		0.4309		0.5075		0.4009	
Wald chi2	114.31		87.23		210.17		179.67	
Prob >	0.0000		0.0000		0.0000		0.0000	

Source: Authors calculations based on data taken from audit reports of the Mix Market website. * represents the level of significance. *significant at 10%; ** significant at 5%; *** significant at 1%.

The R^2 in regression [13] which reflects the direct effect of subsidy on a MFI's efficiency shows that 12.97% of the variation in the efficiency is as a result of subsidy. The results further reflect that subsidy is significant and positively related to administrative costs per borrower as a 1% increase in the subsidy leads to a 0.26% increase in the administrative costs. This is supported by literature which shows that administrative costs of subsidised MFIs in SSA are higher than for those that are not subsidised because of the added cost of capital (MicroBanking Bulletin, 2006).

Regression specification [14] shows the results of the relationship between a MFI's efficiency measures and the loan size per GNI, which is a proxy for outreach. The coefficients are positive and significantly related to administrative costs showing that increasing the levels of outreach significantly increases MFI's costs. The reason for this is that outreach increases the volumes of transactions in the MFIs through the increased number of loans disbursed to poorer clients. The inclusion of subsidies, as shown in regressions [15] and [16], shows that the coefficients for subsidised MFIs increase at lesser magnitudes of 0.19 and 0.22 than for those that are not subsidized. This finding shows the pseudo efficiency effect of subsidies causing it to appear as if the subsidised MFIs have lower costs and therefore are performing more efficiently than they actually are.

The national wealth, as represented by the variable GNI per capita, has a positive and significant relationship to administrative costs. The magnitudes of the coefficients increase when subsidies are included in the regressions as shown in [15] and [16], reflecting MFIs located in wealthier countries are more efficient because of the lower costs associated with issuing loans to wealthier clients who have larger sized loans.

With increases in age and experience, MFIs become more efficient than when in the early stages of development as seen in the results of the regression [14] in Table 5.6 where the administrative costs are low for institutions which are not subsidised. The results further show that subsidising MFIs reduces their ability to become more efficient over time confirming the negative effect of subsidies on MFI's efficiencies.

NGOs have higher administrative costs because their focus is generally on very poor clients and women's groups making them less efficient than NBFIs whose focus is on earning sufficient levels of revenues to be profitable.

5.3.2.4 Productivity regression

As with efficiency the productivity of MFIs is a good indicator of performance. The variable number of borrowers per staff is used as a proxy for staff productivity in the regression.

Table 5.7: Productivity regressions

Variables	Dependent variable DIRECT EFFECT Borrowers per Staff /Subsidy [17]		Borrowers per staff / without subsidy regression [18]		Borrowers per Staff / with subsidy regression [19]		Borrowers per Staff /Dummies multiplied with subsidy regression [20]	
Borrowers per staff	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
Subsidy	-0.289***	0.018	-	-	-0.282***	0.019		
Loan size/GNIpc$_{ppp}$			-0.189***	0.045	-0.112***	0.033	-0.116***	0.032
Women Borrowers			-0.005**	0.002	0.001	0.002	0.002	0.002
GNIpc$_{ppp}$			-0.011	0.158	-0.092	0.141	-0.111	0.132
MFI age								
Young			0.219	0.168	0.159	0.124	0.175	0.123
Mature			0.322*	0.187	0.194	0.143	0.230*	0.142
Region							-0.053	0.050
East Africa			0.309	0.283	0.249	0.263		
West Africa			-0.317	0.298	-0.254	0.276		
Central Africa			0.088	0.250	0.088	0.232		
Lending methodology							0.004	0.120
Individual & Group			-0.283	0.393	-0.255	0.365		
Group			-0.107	0.384	-0.133	0.357		
Status							-0.050	0.103
NGO			0.254	0.309	0.279	0.282		
Cooperative			0.865**	0.375	0.919***	0.349		
Rural Bank			0.045	0.262	0.101	0.243		
Savings Portfolio							-0.052	0.086
Required Saving			-0.140	0.229	-0.105	0.212		
No Saving			-0.317	0.388	-0.145	0.360		
Other services provided			-0.061	0.192	-0.003	0.178	-0.258	0.169
Regulated			0.025	0.249	0.013	0.232	0.122	0.191
R Square	0.1970		0.2117		0.3770		0.3073	
Wald chi2 (1)	(253.81)		41.69		286.10		278.14	
Prob >	0.0000		0.0007		0.0000		0.0000	

Source: Authors calculations based on data taken from audit reports of the Mix Market website. * represents the level of significance. *significant at 10%; ** significant at 5%; *** significant at 1%.

Regressions [17] and [19] show the direct effect of subsidies on the productivity. The coefficients are negative and significant at the 1% level indicating that subsidies have a negative effect on the productivity of a MFI's staff since a 1% increase in subsidy leads to a 0.28% decline in the number of borrowers per staff.

An increase in the loan size per GNI reduces the number of borrowers per staff implying that a decline in the outreach, shown by an increase in the loan size, will decrease the staff productivity in the institutions. This decrease in productivity is as expected since literature indicates that a decline in outreach caused by fewer clients being able to afford the larger

sized loans, results in lower productivity and higher transaction costs as clients demand improved services (Hudon and Traća, 2008).

The variable age of the MFI is significant at the 10% level showing that older institutions are more productive than the younger ones as would be expected. Furthermore the results show that productivity improves with age. However the magnitudes in the regressions show that subsidized MFIs are less productive than MFIs that are not subsidised.

Cooperatives are more productive than NBFIs as shown by the positive and significant relation with borrowers per staff. This finding is important as it highlights the differences in the productive structures of the institutions. The business structure of cooperatives makes them more productive because they have comparatively higher revenues and lower costs and in most cases their clients are limited and employed and can therefore afford the associated costs (MicroBanking Bulletin, 2006).

5.3.2.5 Real interest rate regression

The interest rate charged on loans is a key source of revenue for MFIs especially those without savings/deposit accounts. There are many factors that influence the rate of interest rates charged, some of which are not within the institution's control. These include environmental factors such as the wealth of the country, levels of inflation and political influence.

Table 5.8: Real interest rate regressions

Variables	Dependent variable DIRECT EFFECT OSS/Subsidy [21]		Interest rates charged on loan without subsidy [22]		Interest rates charged on loan with subsidy [23]		Interest rates charged on loan multiplied with subsidy [24]	
Interest rate charged on loans	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error	Coefficient	Std Error
Subsidy	0.658***	0.097	-	-	0.053	0.074		
Loan size/GNIpc$_{ppp}$			-0.137	0.384	-0.141	0.384	-0.235	0.378
Admin Costs/ Borrower			0.767*	0.441	0.783*	0.441	1.052**	0.487
Women Borrowers			0.006	0.019	0.005	0.019	0.013	0.019
GNIpc			-3.527***	1.150	-3.637***	1.122	-2.529	1.098
Financial Costs			5.170***	0.785	5.059***	0.767	-0.494***	0.037
Inflation			-0.473***	0.038	-0.476***	0.039	5.596***	0.740
MFI age								
Young			0.048	1.360	-0.045	1.357	-0.116	1.359
Mature			0.443	1.484	0.432	1.470	0.075	1.447
Region							0.894	0.815
East Africa			-3.815*	2.042	-3.586***	2.001		
West Africa			1.706	2.149	1.836	2.091		
Central Africa			-0.371	1.774	-0.291	1.725		
Lending methodology							2.004	1.549
Individual & Group			-1.620	2.781	-1.427	2.717		
Group			-0.068	2.715	0.036	2.642		
Status							-2.049	1.213
NGO			3.125	2.227	3.318	2.178		
Cooperative			2.260	2.638	2.086	2.575		
Rural Bank			1.405	1.879	1.563	1.834		
Savings Portfolio							-0.989	0.949
Required Saving			0.345	1.616	0.502	1.584		
No Saving			0.582	2.719	0.629	2.642		
Other services provided			-0.564	1.365	-0.685	1.334	-1.335	1.758
Regulated			-0.338	1.799	-0.293	1.749	1.762	2.007
R Square	0.1451		0.6217		0.6295		0.5765	
Wald chi2 (1)	(2.09)		291.82		296.89		275.23	
Prob >	0.0000		0.0000		0.0000		0.0000	

Source: Authors calculations based on data taken from audit reports of the Mix Market website. * represents the level of significance. *significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5.7 shows the regression results for interest rates charged on loans. The R^2 in regressions [22] and [23] show that 62% of the variation in the interest rates charged on loans is explained by variables in the model. Regression [24] shows that 58% of the variation is explained by the variables selected. Regression [21] shows the direct effect of subsidies on interest rates charges. The results show that interest rates have a positive and significant relationship to subsidies, implying that 1% increase in the subsidies leads to a 0.66% increase in the interest rates charged on loans by MFIs. Fourteen percent of the variation in the interest rates charged is determined by the subsidy variable.

Regressions [22] and [23] show that administrative costs per borrower, GNI per capita, financial costs and inflation are the significant variables. The regressions show that the variable administrative cost per borrower has a positive and significant relationship with interest rates charged on loans at the 10% level. It shows that a 1% increase in the

administrative costs per borrower will lead to a 0.76% increase in the interest rates charged on loans. By including the subsidy in the model the magnitudes increase to 0.78% and 1.05%. This shows that over time subsidies can lead to an increase in administrative costs and the interest rates charged by the MFIs.

GNI per capita represents the wealth of a country and is significant at the 1% level and negatively related to the interest rates charged, showing that a 1% increase in wealth reduces the interest rates charged by 3.5% and 3.6%. This result is not surprising as literature states MFIs located in wealthier countries have lower costs as a result of issuing loans to wealthier clients.

Financial costs represent the cost of loanable funds to the MFIs in the form of loans and concessions. The coefficients are positive and significant at the 1% level in regressions [22] and [23]. In regression [24] the results show that a 1% increase in the financial costs leads to a 5.2% increase in the interest rate. The inclusion of subsidy in regression [23] shows only a marginal change in the magnitude, however, regression [24] produces significant and surprising results, in that the relationship between the financial costs and interest rates becomes negative with a magnitude of -0.49. This reflects that as the financial costs increase for highly subsidised MFIs, the rate of increase of the interest rates charged will grow at a negative rate further showing the pseudo interest rate effect of subsidies as subsidised MFIs appear to charge lower interest rates on loans than those that are not subsidised.

The results show that inflation is significant at the 1% level and negatively related to interest rates. The inclusion of the subsidy to the regressions has a very small effect on the relationship, however, the inclusion of subsidies in the environmental variables has a large and significant effect. The coefficient becomes positive and has a large magnitude (5.59), indicating that as inflation increases in highly subsidised MFIs, the rate of increase on the interest rates charged grows. This is because an increase in the inflation leads to a, in this case significant, increase in costs which ultimately leads to an increase in the interest rate charges.

5.4 Summary

The summary findings show that the majority of MFIs in SSA are neither profitable nor sustainable. Even though they are operationally self-sufficient as shown by the OSS average of 136.01, 90.22% of the MFIs that were in the sample were not self-sustainable. This result is significant in that it indicates the depth of the sustainability problem for MFIs on the African continent. The MFI's in the sample are not profitable on average however their performances show that there is potential for growth as can be seen in the efficiency and the productivity results. Other findings show that on average the majority of MFIs in SSA are mature which is important in determining the level of progress toward being sustainable (MicroBanking Bulletin, 2006).

5.4.1 The regressions results

A quantitative approach was used in the analysis in which the financial data of the 92 selected MFIs were estimated using panel data estimation. The method of variable selection was based on the procedure used by Nawaz (2010). This method of determining the relationship between selected performance and sustainability indicators and subsidy was modelled on methods of analysis developed by Yaron (1992a) and the SEEP Network (2005).

The results of the regression analysis show that MFIs in SSA are not profitable in line with the known trends about the region where the average ROA was found to be -1.48%. This finding is supported in literature by CGAP (2010) which found that in 2008 the average ROA for MFIs in SSA was -1.8% (MicroBanking Bulletin, 2009). The reason given for the poor ROA was as a result of inefficiencies and high transaction costs.

The findings in this study indicate that the administrative costs for MFIs in SSA were found to be higher than the average in the rest of the world; caused by weak infrastructure, sparsely located clients and the high numbers of small loans (MicroBanking Bulletin, 2006; 2008). These factors contribute to the high transaction costs and ultimately lead to lower productivity and inefficiencies.

The findings also show that older institutions are more likely to be profitable once they reach maturity (8 years or older). However the inclusion of subsidies leads to a decline in the levels

of profitability, thereby supporting the view that continuous subsidy injections have a reducing effect on the profitability of institutions. This lends support to the view that MFIs need to be weaned from subsidies as early as possible to allow them to develop on their own.

The *status* variable indicates the best business practice model. In regression [2] and [3] NGOs were found to be less profitable than NBFIs, showing that NGOs are not a suitable business practice model when MFI profitability is the goal. Not only are NGOs not profitable but they are also less likely to be sustainable without subsidies, possibly due to their higher inefficiencies and lower productivity levels, brought about by higher numbers of poorer clients and the fact that in most cases the goal of NGOs is to increase outreach rather than being profitable.

The inclusion of subsidies in the finances of regulated MFIs is likely to lead to lower profit levels, highlighting the inhibiting effect subsidies have on the performance of MFIs.

Measures of sustainability are SDI, OSS and FSS as shown in Table 3.1. In general subsidies were found to have a negative effect on sustainability. Including subsidies in the regressions reduced the OSS, FSS and increased SDI, showing that the use of subsidies reduces the likelihood of a MFI being operationally and financially self-sufficient. However, increases in revenue were found to enhance the MFI's ability to be self-sustainable as shown in the positive relationship between yield interest on loans, OSS and FSS.

Increases in administrative costs reduce OSS and FSS and increase SDI showing that costs decrease the potential for MFIs to be sustainable.

Older MFIs are more likely to be operationally and financially self-sufficient than new or young MFIs as expected since institutions that reach maturity have more experience and are therefore more likely to be sustainable (CGAP, 2005).

NBFIs are a more sustainable business model in microfinance in SSA than any of the other models according to the findings. This could be attributed to the NBFIs business model being based on a commercial approach to financial services provision. This approach is based on the MFIs focusing on strong loan portfolios, revenues and lowering administrative costs.

In conclusion the results show that MFIs in SSA in general have higher administrative costs than their counterparts in other continents as a result of high transaction costs brought about by weak infrastructures, sparsely distributed clients and the high cost of loanable funds. The interest rate is positively related to costs and is affected by subsidies, showing that the administrative costs in subsidised MFIs tend to be higher. Furthermore, MFIs in higher income countries charge significantly lower interest rates on loans as expected. The findings also show that poor clients pay higher interest rates than wealthier clients because of the high transaction costs associated with providing them with financial services (Crabb, 2007; Hudon and Traća, 2008).

Chapter 6: Summary Conclusion and Recommendations

6.1   Summary

This study was motivated by the concern that MFIs in sub-Saharan Africa are overly reliant on subsidies. Microfinance is an important contributor to the financial, economic and social development of the poor and as such the impact of a reduction in donor funding may result in serious economic and financial decline for the sector. As a result this research undertook to identify, highlight and analyse variables that can show the effect of subsidies on the performance and sustainability of MFIs. This research is relevant at this time in light of concerns about the challenges faced by the sector including a decline in donor funds and the world financial crisis as well as the real contributions of MFIs to poverty reduction.

A quantitative approach was used in which financial data of 92 MFIs from sub-Saharan Africa, affiliated to the MIX, were selected and analysed using panel data estimation techniques.

The method of analysis followed was based on a procedure used by Nawaz (2010). This method of determining the relationship between subsidies and selected performance and sustainability indicators uses Yaron's SDI measure and the SEEP Network's measures of operational self-sufficiency and financial self-sufficiency. Administrative costs per borrower and the number of borrowers per staff were selected as proxies for efficiency and productivity respectively. Nawaz (2010) further included the analysis of interest rates in his study because of its impact on MFI's revenue and cost structures.

Six regression models were established so that regressions on specific profitability, sustainability, efficiency, productivity and the real interest rate variables could be carried out. Each regression equation was run in four specified regressions to which subsidy was gradually included in the model. The responses of the dependent variables to these changes were then monitored.

The summary results of the analysis showed that the majority of MFIs (90.22%) were not sustainable nor were they found to be profitable. However, the results show that all the

institutions were operationally self-sufficient and that on average MFIs in SSA charged higher interest rates than similar MFIs in other parts of the world. This finding, combined with the fact that MFIs in the continent have higher administrative costs serves to highlight how these institutions end up having higher costs than their counterparts in other parts of the world.

The regression results support the summary findings and empirical literature in general, showing that increasing costs tend to reduce the likelihood of profitability. However as MFIs mature (get older), they perform better in terms of turnover and cost which leads to them attaining levels of profitability.

The findings of the sustainability regressions show that MFIs are operationally self-sufficient, meaning that they are able to cover their operational (direct) costs with the revenue from their operations, however they were found not to be financially self-sufficient. The OSS average was 136.01%, however the average FSS value was 74.32% indicating that MFIs are not able to raise enough revenue to cover their capital and indirect costs which will ultimately result in them running out of equity funds. This finding is common in MFIs operating in countries with low income levels (MicroBanking Bulletin, 2006). Furthermore, the results of the frequency distribution in Table 5.3 show that only 9.78% of MFIs in the sample were found to be self-sustainable which is an extremely low yet expected, as literature shows that over the years the FSS of MFIs in low income countries of Africa have been below the breakeven point of 100% (MicroBanking Bulletin, 2006; 2008). The inclusion of subsidies in the model shows a decline in the ability of the MFIs to attain operational and financial self-sufficiency.

NBFIs are the most suitable business model practice for MFIs in Africa according to the findings which reflect that NBFIs are more sustainable, profitable and efficient than any of the other business models in the sample. However, cooperatives were found to be the most productive business model as they have a higher borrower to staff ratio than the other institutional types. This is because the legal structure of cooperatives limits the number of clients, meaning that they can focus on growing their equity base without having to divert resources to other profit generating activities. Furthermore cooperatives have clients who are employed and therefore can afford to take larger sized loans unlike other institutions such as NGOs whose focus is in helping the very poor.

Regulation is an inhibiting factor in the profitability when MFIs are subsidised, as the results show that when MFIs are subsidised there is a visible decrease in the profit levels. This is supported by literature that shows that increasing subsidisation in MFIs has a significant and negative effect on profitability and ultimately on performance (Hudon and Traća, 2008).

Older institutions were found to be more likely to be sustainable than new and young MFIs because of their improved efficiency and productivity and because they have more experience and are therefore better equipped to overcome challenges. They are also generally better supported showing that donors have not been successful in selecting and disbursing subsidies to deserving institutions (such as those in the early stages of development). However, based on the literature, it can be assumed that over time the effect of subsidies can lead to a decline in MFI's sustainability (Crabb, 2007).

The results also show that growing the loan portfolio has a significant and positive effect on MFI's sustainability indicating that they can expand their revenues by improving the scale of their operations through the loan portfolio. This finding is supported by Crabb (2007), showing that MFIs are better served by improving their revenues through the growth of their loan portfolios and outreach.

It can also be seen that inflation and interest rates have a negative effect on MFIs sustainability as they increase costs through price increases which ultimately leads to the MFIs having lower numbers of low income clients. Inflation leads to increases in costs for the MFIs. To recover the costs MFIs raise their interest rate charges making credit more expensive especially for their poor clients.

One of the key activities of MFIs is to improve their outreach, as this will increase the number of clients and the volumes of deposits and loans disbursed to poorer clients. However, including subsidy in the analysis leads to a reduction in the efficiency and productivity of the MFIs further revealing the negative effect of subsidies on the efficiency and productivity of the institutions.

Further results show that MFIs located in wealthier countries are more efficient as a result of lower costs associated with issuing loans to wealthier clients with larger loan sizes. MFIs in lower income countries have to overcome limitations of weak infrastructure and, low

population densities and rural markets. The findings also indicate that once subsidised, MFIs become less efficient than those that are not subsidised leading to an eventual lower outreach and increased cost per unit loan.

Cooperatives were found to be more productive than NBFIs as shown by the positive and significant relation with borrowers per staff. This result highlighted how the institutional type and business structure have an impact on the productivity of MFIs. In this case the business model of cooperatives made them more productive with comparatively higher revenues and lower costs than any of the other MFI types in the sample.

Interest rate charges can be both beneficial or an inhibitor to portfolio growth. They can enhance the revenue streams through interest charges on loans but can also prevent entry into the institutions for potential clients when the rates are unaffordable. Increasing administrative costs in many instances leads to the institution's increasing the interest rate charges as these are used to cover the operational and financial costs. The determination of interest rates to charge is however dependent on the prevailing regulation and politics of the different countries. This makes interest rate determination challenging to monitor and compare.

6.2 Conclusion

There were very few surprises in the findings with the majority of outcomes showing results that are typical of the microfinance sector in SSA. The results reflected that the majority of microfinance institutions struggled to attain profitable levels of operation during the period under study. The findings show that these institutions recorded low ROA figures, which in most cases were the lowest amongst all the institutions worldwide. This trend can be explained by the fact that MFIs in SSA earned low amounts of revenues and have high operational costs when compared to other MFIs around the world during the period of study. The low revenue earnings can be attributed to high numbers of poorly performing institutions (both small and large MFIs) (MicroBanking Bulletin, 2008).

Furthermore MFIs in SSA are also not financially self-sustainable and charge higher interest rates than those in other parts of the world. The reasons for this are that these institutions

operate in countries which face challenges of weak infrastructure, high operational costs and low population density. The MFIs also allocate larger amounts for loan loss provisions which reduce the operating revenues. However, these institutions are in fact able to generate enough revenue to be operationally self-sufficient.

Efficient MFIs are those that keep costs of serving their clients low. The findings in the study show that MFIs in SSA struggle to attain consistent levels of efficiency, mainly because most of them operate in rural markets and in countries with weak infrastructure that have poor communication channels and negative impact on costs. The findings also show that NGOs are not profitable and are also less likely to be sustainable without subsidies. The reason for this is likely due to their business model strategies which are focused not only on increased outreach and women's groups but also are less efficient than similar institutions on other continents.

Productive MFIs are those that maximise their services while using the minimum levels of resources. In the analysis it was found that cooperatives have the more productive business model when compared to NBFIs, highlighting the differences in the productive structures of the institutions but also showing that the business structure of cooperatives makes them more productive because they have high revenues and low costs and in most cases their clients are employed and can therefore afford the associated costs.

6.3   Recommendations

Subsidies are an important buffer for the development of newly established MFIs, especially in developing economies that face economic growth limitations. By using subsidies institutions can be protected at the nascent stage of growth allowing them to develop and become established. Furthermore, subsidies help speed up the growth of the financial sector in these economies. Subsidies should however be used sparingly among MFIs in the early stages of development. The research findings support this assertion as they show that with increased maturity the MFIs were found to be more productive with less subsidisation as opposed to when they are fully subsidised. Furthermore these institutions should be monitored overtime to ensure that they are weaned from the subsidies before they are overly dependent, while those institutions that are unable to reach operational and financial self-

sufficiency should either have their status changed by governments or should cease to exist without further jeopardising public resources.

In light of the findings in this study the following recommendations are further suggested:

1. MFIs should continue to promote quality loan portfolios, increased outreach, growing deposit accounts and keeping costs as low as possible.

2. The microfinance sector should select business models that are suited to their immediate surroundings. Cooperatives and NBFIs have the most efficient and productive business models for MFIs in SSA when the goal is profitability, however, NGOs are still the most relevant business model when outreach is the goal.

3. MFIs are increasingly facing competition from commercial banks and therefore need to be innovative on ways to retain and grow their client base. This is not only done by increasing loan portfolios and outreach, but by also promoting the use of new products such as cell phone and remote banking innovations.

4. Transparency, especially in finance is important and MFIs must understand the necessity of supplying quality data which can be used in analysis and which will help identify develop and strengthen the sector.

5. Finally all stakeholders involved in the development of the sector must be committed in order to mitigate risks associated with costs and identify weaknesses and strengths, so as to attract investors and to make information about the sector readily available.

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The World Bank website: www.worldbank.org

APPENDIX

Table 1: MFIs in sub-Saharan Africa, 2006 - 2008 used in the analysis

REGION	COUNTRY	MFI
(Total # of MFIs)	92	
Southern Africa (18)	Angola	KixiCredito
	Malawi	FINCA, CUMO, OIBM, TIAVO
	Madagascar	MicroCredit, TIAVO, Otiv-Diana
	Mozambique	NovoBanco, Khuvuku, Bom, Tchuma
	Namibia	KOSHI YOMUTI
	South Africa	SEF, Capitec
	Swaziland	FINCORP
	Zambia	FINCA, CETZAM
Eastern Africa (27)	Ethiopia	ACSI, BG, SFPI, GASHA, DESCI, ESHET, WASASA, WISDOM
	Kenya	Metemanen, PEACE, BIMAS, EQUITY BANK, KADET, KWFT, K-REP, FAULU, SMEP
	Tanzania	SEDA, Pride, FINCA, BRAC
	Uganda	Opportunity, Centenary, BRAC, Finance Trust, FINCA, MEDNET
Western Africa (35)	Benin	PAPME, Alide, FECECAM, Vital Finance
	Burkina Faso	RCPB
	The Gambia	GAFWA, Reliance
	Guinea	RCG, CPECG
	Ghana	APED, CRAN, SAT, OISL, FASL, KSF, ProCredit, Maata-N-Tudu
	Mali	Kofo Jiginew, Kondo Jigima, Nyesigiso, Miselini, Soro Yiriwaso
	Niger	MECREF
	Nigeria	SEAP, LAPO-NGR, DEC, Alliance
	Senegal	ACEP, CMS, PAMECAS, MEC-FEPRODES, Caurie Micro Finance
	Sierra Leone	ARD
	Togo	WAGES, FUCEC
Central Africa (12)	Burundi	Turame Community Finance
	CAR	CMCA
	Cameroon	CamCCUL, CCA, CDS
	Chad	UCEC-MK
	Congo REP	CAPPED
	DRC	PAIDEK, FINCA
	Rwanda	RML, UOB, COOPEDU

Source: The MIX, 2010

Table 2: Correlations matrix

	sdi	oss	fss	roa	Real int rate	GNI ppp	Avg loan size	Women borrowers	Borrowers per staff	Admin cost/ staff	adm. cost/borrower	Financial cost	Age of MFI	Inflation
SDI	1													
OSS	-0.0022	1												
FSS	-0.0130	0.4358***	1											
ROA	-0.0953*	0.006	0.056	1										
Real interest rate	0.0795	0.1536**	0.0067	-0.1218**	1									
Gnipc ppp	-0.0129	0.0029	-0.005	-0.0835	0.2106***	1								
Avg loan size	0.4005***	-0.0303	0.0487	0.0774	-0.179***	0.0984*	1							
Women borrowers	0.1438**	0.0275	0.0981*	-0.1073	0.1721**	0.0606	-0.2935***	1						
Borrower/staff	-0.0336	-0.0043	-0.0287	0.0885	-0.0845	-0.0013	-0.0651	0.0384	1					
Admin. Cost/staff	-0.0033	-0.0163	-0.0008	-0.0240	0.2206***	0.3714***	0.4530***	-0.2551***	0.0558	1				
Admin. cost/borrower	0.9245***	-0.0162	-0.0121	-0.0451	-0.0915	-0.0263	0.4887***	0.0801	-0.0406	-0.0151	1			
Financial cost	0.1861**	-0.0039	-0.0652	-0.2400***	0.3891***	-0.1370**	-0.0006	0.1098*	-0.0648	0.0403	0.0923	1		
Age of MFI	-0.1618**	-0.0287	-0.0193	0.1450**	-0.200***	0.0400	0.0632	-01940**	0.1751**	0.0568	-0.0995*	-0.1996***	1	
Inflation	-0.1115*	0.0135	-0.139**	0.0729	-0.0142	-0.1529**	-0.1762**	-0.0400	0.1392**	-0.2118**	-0.0657	-0.0246	-0.01213**	1

Source: Authors calculations based on data taken from audit reports directly and from the Mix Market website. * represents the level of significance. *significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3: Summary statistics

Variable		Mean	Std. Dev	Min	Max
id	overall	46.500	26.605	1.000	92.000
	between		26.702	1.000	92.000
	within		0.000	46.500	46.500
y	overall	2.007	0.818	2006	2008
	between		0.000	2.007	2007
	within		0.818	2006	2008
SDI	overall	0.396	1.160	-2.353	18.146
	between		0.714	-0.830	6.128
	within		0.916	-5.626	12.415
OSS	overall	136.012	504.841	4.500	8473.000
	between		292.157	36.573	2891.587
	within		412.467	-2664.284	5717.426
FSS	overall	74.32376	108.5163	-419.3346	1537.9
	between		85.82441	-118.2863	774.973
	within		80.53491	-738.6032	787.2508
ROA	overall	-1.486	13.581	-85.070	20.480
	between		12.402	-63.367	12.583
	within		5.636	-33.590	27.484
Inflation	overall	10.783	8.474	-8.975	44.391
	between		6.313	3.120	24.646
	within		5.679	-1.554	30.527
Real Interest Rate	overall	16.746	9.377	-17.200	32.271
	between		8.539	-9.861	26.881
	within		3.920	-4.765	16.140
GNIpc $_{ppp}$	overall	1494.302	1446.218	278.758	9780.000
	between		1448.170	287.910	9400.000
	within		97.998	867.636	2117.636
GNIpc $_{cur}$	overall	713.513	920.698	110.000	5820.000
	between		919.063	123.333	5656.667
	within		95.663	-26.487	1513.513
Age of MFIs	overall	11.370	7.127	0.000	40.000
	between		7.106	1.000	39.000
	within		0.818	10.370	12.370
Loan/Asset	overall	7.47	0.217	0.007	15.24
	between		0.179	0.218	1.222
	within		0.124	0.131	1.231
Financial Cost	overall	16.832	8.977	0.019	47.000
	between		8.841	0.031	45.533
	within		1.729	6.499	21.999
Financial cost/Asset	overall	0.183	1.062	0.000	10.100
	between		1.054	0.000	9.797
	within		0.161	-1.287	1.140
Admin. cost/Asset	overall	0.2106	14.240	0.003	31.837
	between		14.184	0.005	122.283
	within		1.743	-19.055	13.025

Average Loan Size	overall	515.228	736.408	2.376	6381.575
	between		651.987	37.254	3903.710
	within		346.846	-2478.518	2993.093
Loan size/GNIpc ppp	overall	0.5161	48.866	0.001	62.732
	between		45.624	0.019	437.990
	within		17.931	-221.135	194.403
Loan size/GNIpc curr	overall	1.2826	138.514	0.000	217.3099
	between		113.381	0.031	1088.428
	within		80.152	-558.806	1097.496
Yield interest on loan	overall	40.274	25.560	0.234	147.977
	between		24.093	5.066	121.359
	within		8.778	-2.844	82.060
Borrowers/Staff	overall	179.145	297.312	0.067	4036.000
	between		273.718	9.022	2616.000
	within		118.397	-1042.855	1599.145
Women Borrower	overall	62.738	25.641	1.370	100.000
	between		24.189	18.130	100.000
	within		8.753	29.571	99.185
Admin. cost/Staff	overall	5672.201	4099.253	277.136	33972.800
	between		3836.874	411.792	25176.260
	within		1479.642	-1627.871	14468.750
Admin. cost/Borrower	overall	154.819	313.681	0.1922	6081.500
	between		2120.519	1.607	20392.070
	within		2931.687	-19797.630	39974.150
Region	overall	1.5	1.007	0	3
	between		1.011	0	3
	within		0	1.5	1.5
Lending Methodology.	overall	0.478	0.618	0	2
	between		0.620	0	2
	within		0	0.4782609	0.478261
Status	overall	1.174	1.159	0.000	3.000
	between		1.164	0.000	3.000
	within		0.000	1.174	1.174
Other Services	overall	0.663	0.474	0.000	1.000
	between		0.475	0.000	1.000
	within		0.000	0.663	0.663
Saving	overall	0.554	0.853	0.000	2.000
	between		0.856	0.000	2.000
	within		0.000	0.554	0.554
Regulated	overall	0.761	0.427	0.000	1.000
	between		0.429	0.000	1.000
	within		0.000	0.761	0.761
N=276	n=92	T=3			

Source: Authors calculations based on data taken from audit reports directly and from the Mix Market website. * represents the level of significance. *significant at 10%; ** significant at 5%; *** significant at 1%.