



St. Mary's University - School of Graduate Studies

MBA Program (Regular)

THE DETERMINANTS OF FINANCIAL PERFORMANCE OF MICROFINANCE
INSTITUTIONS IN ETHIOPIA: INTERNAL FACTOR ANALYSIS

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ID.No. SGS1/0047/2004

November 2013

Addis Ababa



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By

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A Thesis

Submitted in Partial Fulfillment of the Requirements for the Degree of Master's in Business
Administration (MBA)

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DEDICATION

TO GOD IS THE GLORY!

This Work is dedicated to my father, Zeray Kifleyohannes.

May God rest his soul in heaven!

ACKNOWLEDGMENT

First of all I would like to thank my advisor Dr. Zenegnaw Abiy for his unreserved and genuine comment and advice throughout the development of this paper.

I would also like to take this opportunity to extend my sincere gratitude to the NBE Microfinance supervision and AEMFI officials and staff especially Ato Anteneh Kifle who have provided me with the necessary information about the institutions.

Last, but far to be the least, I am extremely indebted to my mother Hiwot Abreha; I would also like to thank my dear wife Genet Miruts for being both as a mother and a father while I was busy with the studies and to my children who had to put up with my absence and distractedness; I would also like to extend my gratitude to: my children, my brother Hadera Zeray, my beloved relatives Tilahun G/Selassie and Mesele W/Mariam; my friends: Nebiyate Belete, Angesom Berhane, Heron Alemseged and Tizita Bizuneh , and all my family, relatives and friends who contributed their part to make this study real.

ACRONYMS

ACSI = Amhara Credit and Saving Institute
ADCSI = Addis Credit and Saving Institute
AEMFI = Association of Ethiopian Micro Finance Institutions
AVFS = Africa Village Financial Services S.Co
CGAP= Consultative Group to Assist the Poor
DE= Debt to Equity
DECSI = Dedebit Credit and Savings Institute
DTA= Deposit to Asset
FE= Fixed Effects
JCC=Joint Consultative Council
MFIs = Microfinance Institutions
NBE=National Bank of Ethiopia
NGOs= Non-Government Organizations
OCSSCO = Oromia Credit and savings share company
OLS= Ordinary List Squares
PaR= Portfolio at Risk
PEACE= Poverty Eradication and Community Empowerment
RE= Random Effects
ROE= Return on equity
SFPI = Specialized Financial and Promotional Institution
SMEs= Small and medium sized enterprises
VIF= Variance Inflating Factor

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ABSTRACT

The study was carried out with the aim to ascertain the significant determinants of Ethiopian Microfinance Institutions' financial performance. The study followed a quantitative research approach using a balanced panel data set of 108 observations from 12 MFIs over the period 2003-2011. The Pooled OLS regression analysis was applied in order to get the results. The findings of the study indicate that most of the MFIs are highly leveraged. Further the result of the regression analysis shows capital(financing) structure and MFIs' size were found to have statistically significant impact on profitability(adjusted return on equity) and these can be taken as significant predictor variables in determining return on equity of the Ethiopian MFIs. However, portfolio quality, efficiency and productivity have insignificant impact on financial performance of MFIs in Ethiopia for the study periods. Based on the findings, the researcher recommends the concerned bodies to give due attention to enhance the size of MFIs as this positively affect the financial performance of institutions under study. Moreover, the MFIs have to be encouraged to work on deposit mobilization since it is considered as a cheap source of funds. The researcher also suggests further studies on the impact of subsidy and grants on financial sustainability; impact of age and type of ownership on financial performance of MFIs.

Keywords: Return on Equity, Profitability, Microfinance, Ethiopia

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the study

Microfinance Institutions (MFIs) globally assist the poor to get access to capital and escape persistent poverty (Florkowski and Sheremenko , 2012).

According to a United Nations report of 2013 on The Hunger Project, sustainable operations of MFIs from 1999, in African countries (Uganda, Benin, Ghana, Ethiopia, Malawi, Burkina Faso, Mozambique and Senegal) had accumulated 2.9 million U.S dollars loan portfolio, 1.6 million U. S dollars savings and advanced 28 rural financial institutions to their independence by 2011.

The fundamental services that the MFIs provide are the same that conventional financial institutions offer to their clients; the only difference is the scale and method of service delivery. There have been a huge growth in the microfinance industry for over a decade, but there is still a long way to go, it only reaches a small percentage of its potential market worldwide (Ledgerwood, 2006).

Microfinance can be a powerful instrument against poverty, but it is only when supply meets demand that the poor people can find their way out of poverty. According to the most recent estimates microfinance has reached one hundred and fifty million individuals worldwide (Armendariz & Labie, 2011). There is a huge demand for small scale commercial financial services among the world's poor and low income people. The financial services can help them improve household and enterprise management, increase productivity, smooth income flows and consumption costs, enlarge and diversify their micro-businesses, increase their incomes, and empower their way out of poverty. But unfortunately the formal financial sector is rarely able to cover the demand for these financial services (Robinson, 2001). Credit is often widely available from informal commercial moneylenders, pawnbrokers, rotating savings, and credit associations but typically at a very high cost to the client (Robinson, 2001). To sustainably achieve the global goal of lowering poverty among the poor through access to finances, MFIs have to be financially gainful and free from interferences from funding sources, most of which are short-lived (Ayayi, 2012).

As the study conducted by Amha (2004) indicates, the potential demand for micro-credit in Ethiopia is enormous. However, there is very limited supply of financial services to the poor households. The major sources of loans or financial services in Ethiopia are as follows:

1. Commercial banks
2. Microfinance institutions (MFIs);
3. Cooperatives (savings and credit cooperatives and multipurpose Cooperatives);
4. NGOs which are involved in the delivery of financial services;
5. Government projects and programs involved in providing loans;
6. Semi-formal finance (Iqqub, Iddir, etc.); and
7. Informal finance (money lenders, traders, suppliers credit, friends, relatives, etc)

As Amha (2004) indicates, the loanable funds of MFIs in Ethiopia are primarily from six sources and these include:

- a) Mobilizing savings
- b) Equity
- c) Loan from formal banks
- d) Rural Financial Intermediation Program (RUFIP)
- e) Donation
- f) Income from lending activities

According to Amha (2000), the main problems of the country include poverty and unemployment. The government of Ethiopia has been providing attention to reduce poverty in the country. Microfinance is considered as one of the tools for fighting poverty. Until 1996, loans for the low income population section of the population or micro-entrepreneurs in Ethiopia were provided through government programs, cooperatives and Non-government Organizations. These programs were charging subsidized interest, based on the view that the poor do not have the capacity to pay their debt at market interest rates.

Most of such programs have been experiencing lower repayment rates, high arrears. Most of the Non-Governmental Organizations were not taking at most care in collecting the loan disbursed by them. As a result, it has contributed to uncontrolled default and loss of saving of people. In addition, it has also hampered the credit culture in urban and rural areas of the country (Amha, 2000).

The formal banking system in the country presents many restrictions to the lower income section of the population to access economic resources to finance their productive activities. This has led to give more attention to microfinance as financial intermediary through which the poor section of the population gets access to financial services.

In order to provide microfinance services to the lower income section of the population and to carry out microfinance service in a sustainable way, the proclamation of licensing and supervision of microfinance institutions (proclamation No. 40/1996) was issued in 1996 and was later on revised in the year 2009.

The formal establishment of Micro finance institutions in Ethiopia was started in 1997 following the issuance of Proclamation No. 40/1996 in July 1996. The first group of few MFIs was established in 1997 with the objective of poverty alleviation through the provision of sustainable financial services to the poor who actually do not have access to the financial support services of other formal financial institutions.

Regarding the minimum capital required for new MFI entrants, directive No. MFI/01/96 states that MFI applying for a license was supposed to have a minimum paid up capital of 200,000 Birr. The minimum capital required by the NBE is low compared to 75, 000, 000 Birr for banks. However currently, the minimum capital required by the NBE for banks have reached 500,000,000 Birr while for that of MFIs' is 1,500,000 Birr. This is a deliberate action of the government to improve entry and growth in the microfinance industry. In addition to the minimum capital requirement, an MFI applying for a license is expected to submit memorandum and articles of association, work plan indicating major financial services to be offered, overview of economic conditions of the area, cash flow, income statement and balance sheet projections for the 10 first year of the operations, curriculum vitae of board of directors and the Chief Executive Officer (Directive No.FI/01/1996 of NBE).

As of June 2013, there are 32 MFIs that have been licensed by NBE and have been playing the role of promoting and accessing financial services mainly to the rural areas. The microfinance sector is growing in terms of number and size. As the data from NBE indicates, the microfinance industry has been able to serve more than 2.8 million active borrowers with total loans of US\$ 468.6 million through their 741 branches and 483 sub branch offices (NBE, 2013).

As the data obtained from the MIX Market as of June 2013 indicates, the number of depositors has reached 1.8 million with total deposits of US\$ 254 million.

This study is aimed at examining the determinants of financial performance of MFIs in Ethiopia using a pre-determined MFIs' performance indicator variables that include debt to equity ratio, deposit to asset ratio, firm size, loan officer productivity, operating expense ratio and portfolio quality.

1.2 Statement of the Problem

Like in many other countries, the Ethiopian MFIs aim at helping the poor without sufficient guarantees and/or living in remote areas to cope with risk, smooth consumption, fund projects and build credit history through financial services. Hence MFIs may improve customers' welfare and act as an effective tool to fight poverty, empower the poor and promote microenterprises growth.

MFIs pursue a "double bottom line" which means providing basic financial services to individuals excluded from the formal financial system while ensuring financial performance (profitability). In order to sustain the MFIs also have to cover their operating expenses (salaries, transport, and rents), financial expenses and provisions for debt, by the product of interests charged to customers without relying on subsidies or donations.

Better capital structure decision making amongst MFIs will minimize risk, maximize financial flexibility, and encourage the long-term solvency needed to provide sustainable financial services to poor clients (CGAP, 2007).

Although the potential demand for micro-credit in Ethiopia is enormous, as the data from NBE as of June 2013 indicates, the microfinance industry has been able to serve only around 2.9 million active borrowers which only cover less than 20% of the total microfinance demand in the country.

Generally, the Ethiopian MFIs are facing many challenges: Funding is a major constraint of MFIs due to less willingness from commercial banks to lend to MFIs without collateral. Besides, many donors are not keen about MFIs and they are reluctant to fund. The study made by

AEMFI also indicates, although donor funding persists, the share of donor funds as a percentage of total capital declined from 86% in 1999 to less than 40% in 2005(AEMFI, 2005).

The other challenge is less saving habits. As the study made by Amha and Kifle (2012) indicates, “the Ethiopian MFIs have not adequately responded to the unmet demand of depository facilities. The structure of the sector’s assets is dominated by its gross loan portfolio, which constitutes 77% of the industries assets, yet voluntary deposits constitute only 21% of the total assets.”

Mobilizing small and micro-savings can contribute to self-sustainability by providing MFIs with cheaper funds than those from the interbank market because savings is a source of relatively cheap funds (Damian et al., 2003). However, there may be a trade-off between the lower financial costs of mobilizing and administering small deposits.

The financial sustainability of MFIs is a necessary condition for institutional sustainability. It has been argued that unsustainable MFIs will not help the poor in the future because the MFIs will be gone (Hollis & Sweetman, 1998; Schreiner, 2000) as cited in (Aemiro, 2013).

The financial revenue from the loan portfolio is the MFIs’ principal income source and the driver which make up the portfolio yield (total interest, fees and commissions on loan portfolio). This is often used as a proxy for effective interest rates and is an indication of institutions’ ability to cover financial and operating costs. According to a loan product survey made by AEMFI, loans were disbursed at the rate that ranged between 4% and 25 % (Amha, 2008). Moreover, Amha and Kifle (2012) in their performance analysis report for the period over 2008 to 2010, “nineteen of the twenty five which were included in the loan product survey offered various types of loans at an average interest rate of 14 %(institutions calculated their rates using either the flat or declining method). However, the portfolio yield ranged between 4% and 30% and averaged 18% against the average portfolio yield for African MFIs as submitted to the MIX was 33%, which is much higher than the 18% figure reached by Ethiopian MFIs.”

With regard to the type of ownership of MFIs in Ethiopia, they are owned by regional governments, private and NGOs. Bogan (2009) indicates that NGOs often have more poor clients than banks, which often are considered as a more risky segment of the population.

According to Micro Rate (2003), NGOs generally achieve a higher return on asset than licensed and supervised MFIs. However, NGOs with low debt to equity ratios and limited possibilities to get funding in financial and capital markets need to rely heavily on retained earnings to fund future growth. In our case, although the regional governments have shares (which vary from one region to another), they are not interested in getting financial returns from these MFIs as they are not the real shareholders. And this may result in poor financial performance.

In summary, the serious challenge MFIs facing is how to attain financial sustainability and the factors that hinder the MFIs from achieving sound financial performance need to be identified. Though studies have been conducted to determine the factors affecting the financial performance of MFIs, the studies conducted on this area are insufficient; especially studies on internal factors that affect return on equity using quantitative method of data analysis. Therefore, this study was conducted to fill the gap by examining and statistically ascertaining the internal determinants of financial performance of MFIs in Ethiopia.





1.3 Objectives of the study

1.3.1 General Objective

The general objective of this research work is to identify the internal determinants of MFIs' financial performance.

1.3.2 Specific Objectives

To achieve the above general objective, the specific objectives to be addressed include:

-  To determine the impact of leverage(debt-to-equity ratio) on profitability ;
-  To investigate the impact of deposit to asset ratio on the financial performance of MFIs;
-  To analyze the influence of operating expense on the financial performance;
-  To examine the effect of MFIs' size (total asset) on profitability of MFIs.

1.4 Hypothesis

In this section there are six hypotheses which have been tested in this thesis and are presented as follows:

H1: High Debt to equity ratio positively affects financial performance of MFIs.

- H2: High Deposit to Asset ratio has a positive effect on MFI profitability
- H3: High portfolio quality is positively associated with profitability
- H4: High Operating Expense Ratio is negatively associated with profitability
- H5: MFI size has a positive effect on MFI's financial performance.
- H6: low loan officer productivity negatively affects financial performance.

1.5 Operational definition of terms

Concept	Variable	Indicator	Measurement
MFIs' performance Determinants	Return on Equity Ratio	Ratio	Net income/Average Equity
	Operating Expense Ratio	Ratio	Operating expenses/ Average gross portfolio
	Portfolio at Risk (PaR >30)	Ratio	(Outstanding Balance on Arrears over 30 days + Total Gross Outstanding Refinanced (restructured) Portfolio) / Adjusted Gross Loan Portfolio
	Deposit Asset Ratio (DTA)	Ratio	The amount of total deposit as a percentage of total assets.
	Debt/Equity Ratio(Leverage)	Ratio	Total liabilities / Total equity
	Loan Office productivity	Ratio	$\frac{\text{Number of Active Borrowers}}{\text{Number of Loan Officers}}$
	Size	Natural logarithm	Total Asset

1.6 Significance of the Study

This research project is believed to be significant in improving the operation of MFIs by clearly indicating the significant factors that affect the performances of the institutions. The performance indicators could also show where the position of each MFI and this may help the managers take appropriate measures accordingly and improve their performances.

The result of the study is expected to have practical significance as it can help policy makers to formulate appropriate policies for the microfinance industry. Moreover, the result of the study could serve as a reference for further study on the subject matter.

1.7 Scope of the study

The study focuses on the financial side of MFIs operating overall the country. It only covers the determinants of financial performance (profitability) concentrating on internal factor analysis. The research did not cover other performance indicators like outreach and Impact (economic and noneconomic benefits or external factors).

1.8 Organization of the paper

The paper consists of five chapters; the first chapter deals with the introduction part while the second chapter is devoted to the related literature. The third chapter is concerned with methods of the study whereas the fourth chapter concentrates on the results and discussion of the study. The fifth chapter which is the closing one focuses on the summary of findings, conclusion and recommendations.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1 General Overview

2.1.1 What Is Microfinance?

Microfinance has evolved as an economic development approach intended to benefit low-income women and men. The term refers to the provision of financial services to low-income clients, including the self-employed (Ledgerwood, 1999).

2.1.2 The History of Microfinance

In 2001, Robinson described microcredit and microfinance as the terms that came first to prominence in the field of development in the 1970s. As she pointed out, prior to then, from the 1950s through to the 1970s, the provision of financial services by donors or governments was mainly in the form of subsidized rural credit programs. These often resulted in high loan defaults, high loss and an inability to reach poor rural households (Ledgerwood, 1999).

Robinson (2001) also represented the 1980s as a turning point in the history of microfinance in that MFIs such as Grameen Bank and Bank Rakyat Indonesia (BRI) began to show that they could provide small loans and savings services profitably on a large scale. They received no continuing subsidies, were commercially funded and fully sustainable, and could attain wide outreach to clients (Robinson, 2001). It was also at this time that the term “microcredit” came to prominence in development. The 1990s “saw accelerated growth in the number of microfinance institutions created and an increased emphasis on reaching scale and Dichter (1999) refers to the 1990s as “the microfinance decade”.

2.2 Theoretical Review

2.2.1 The microfinance revolution: From “Microcredit” to “Microfinance”

One of the most important departures has involved the shift from “micro-credit” which refers specifically to small loans—to “microfinance.”

The broader term embraces efforts to collect savings from low-income households, to provide insurance (“micro-insurance”) and help in distributing and marketing clients’ output. Robinson (2001) provides a rich description of a “microfinance revolution” that is just beginning.

2.2.1.1 Supply-leading Finance Theory

According to Robinson (2001), supply-leading finance theory refers to supplying finance in advance of the demand for it. The theory came from the combination of three ideas: that the governments of newly emerging nations were responsible for their economic development, that it was crucial for economic growth that high-yielding agricultural technologies be adopted rapidly and extensively, and that most farmers could not afford the full costs of the credit they would need to purchase the inputs for the new technologies. In this context massive subsidized rural credit programs were established throughout much of the developing world. Poor farmers would receive below-market credit and, it was believed, produce higher yields and increase their incomes.

A. Supplying Finance in Advance of Demand

As Robinson (2001) indicates, the essence of provisioning of loans in advance of the demand for credit is for the purpose of inducing economic growth. Prevailing ideas of the time were that the rural areas of developing countries were critically important for national development. This is because supply-leading finance theorists assumed that economic growth in rural areas could be induced through the financial system. As a result financial incentives for the adoption of new agricultural technologies, often in the form of subsidized credit, were provided to farmers in advance of the demand for them. These theorists believed that most farmers could not save enough for the inputs they needed and could not pay the commercial cost of credit. The work of Vogel (1984b) as cited in Robinson (2001) considered savings as the “forgotten half of rural finance”) because it was assumed that in rural areas of developing countries there were little or no savings to be mobilized. Thus, with the emergence of the green revolution in the late 1960s and 1970s, large-scale subsidized credit programs proliferated in developing countries around the world. The approach was later expanded to nonagricultural borrowers.

2.2.2 The Imperfect Information Paradigm

As it has been explained in the work of Robinson (2001), the imperfect information paradigm helps explain a wide variety of economic behavior. Asymmetric information, adverse selection, and moral hazard exist in all credit markets. Yet with the notable exception of peer group lending, models of imperfect information have not incorporated many of the methods used by successful banks and other institutions providing commercial microfinance to overcome these problems. Conversely, some methods that are included in the models have not proven effective in commercial microfinance (Robinson, 2001).

2.2.3 Providers and models of microfinance interventions

The Grameen Bank (2000) has identified fourteen different microfinance models of which two of them are Grameen Bank and the Village Banking models and are presented as follows:

A. The Grameen Solidarity Group model

This model is based on group peer pressure whereby loans are made to individuals in groups of four to seven (Berenbach and Guzman, 1994) as cited in Janner (2012). Group members collectively guarantee loan repayment, and access to subsequent loans is dependent on successful repayment by all group members. Payments are usually made weekly (Ledgerwood, 1999). According to Berenbach and Guzman (1994), solidarity groups have proved effective in deterring defaults as evidenced by loan repayment rates attained by organizations such as the Grameen Bank.

B. Village Banking Model

Village banks are community-managed credit and savings associations established by NGOs to provide access to financial services, build community self-help groups, and help members accumulate savings (Holt, 1994). They have been in existence since the mid-1980s. They usually have 25 to 50 members who are low-income individuals seeking to improve their lives through self-employment activities. These members run the bank, elect their own officers, establish their own by-laws, distribute loans to individuals and collect payments and services (Grameen Bank, 2000a) as cited in Janner (2012). The sponsoring MFI lends loan capital to the village bank, who in turn lend to the members. All members sign a loan agreement with the

village bank to offer a collective guarantee. Members are usually requested to save twenty percent of the loan amount per cycle (Ledgerwood, 1999). Members' savings are tied to loan amounts and are used to finance new loans or collective income generating activities and so they stay within the village bank. No interest is paid on savings but members receive a share of profits from the village bank's re-lending activities. Many village banks target women predominantly as "the model anticipates that female participation in village banks will enhance social status and intra household bargaining power" Holt (1994).

2.2.4 Products and Services

According to Ledgerwood (1999), there are variety of products and services that MFIs can offer to their clients; these are mainly financial services. In addition, some MFIs provide nonfinancial services and description of the most common products that MFIs offer their clients are presented as follows:

A. Credit service

The MFIs lend out credit to people that normally do not have access to it from the formal financial market. Loans are mainly made for productive purposes, but also for consumption, housing and other purposes. Ledgerwood (1999) indicates the three ways of lending out credit made by MFIs which is to individuals, groups or village banks. Individual loans are provided to individuals that can guarantee that they are able to repay and have some level of security. By combining methods for lending decisions from formal and informal financial institutions MFIs have successfully developed effective models for individual lending (Helms, 2006). Another lending methodology is group lending, which consists of groups of people who have a common wish to access financial services. Finally we have the "Village Banking model", where MIFs uses larger groups of between 30 to 100 members, and lend out credit to the group itself rather than to individuals (Ledgerwood, 1999). Poor people are not able to provide collateral, and this is primarily the reason why they are excluded from the formal credit sources (Helms, 2006). Information asymmetry is a major problem for the MIFs when providing services to the clients. MFIs are therefore subject to adverse selection, this occurs when they are unable to determine which costumers are likely to be more risky. They also have the problem of moral hazard, which is the case when MFIs are unable to ensure that the clients are putting in enough effort to make

their investment projects successful, or if the clients try to abscond with the MFIs money (Armendariz & Morduch, 2010).

B. Saving service

MFIs are also providing micro-saving to enable poor and low-income people to store their money safe and give them the possibility to earn a return on savings (Ledgerwood, 1999). Savings can help households to build up assets to use as collateral, it can also help them better smooth seasonal consumption needs, finance major expenditures and self-insure against major shocks. There are two types of savings, compulsory savings and voluntary savings. Compulsory savings can be considered as part of a loan product rather than an actual savings product; it works as collateral for the loan received.

C. Insurance service

Micro-insurance are provided by MFIs to enable poor and low-income people to reduce their risk. The most common insurance products are life insurance and health insurance, but they can also provide weather insurance, property insurance and other types of insurance. But not all of the insurance products have been so successful; one of the main challenges is adverse selection and moral hazard. The interest in micro-insurance is growing, but it still does not have the same width as microcredit (Armendariz & Morduch, 2010).

D. Credit cards and payment service

As Ledgerwood (2007) indicates, some MFIs are beginning to offer services like credit cards and this allow poor and low-income people to access credit when they need it, and have advantages such as streamline operations and an ongoing line of credit to borrowers, enabling them to supplement their cash flow according to their needs. They can also minimize administrative and operative costs for the MIFs. The use of credit cards is still very new, and can only be used when the adequate infrastructure is in place. Payment services include check cashing and check writing privileges, it also include the transfer and remittance of funds from one area to another (Ledgerwood, 1999).

E. Social service

Some MFIs also provide social service, or nonfinancial service, such as social intermediation and enterprise development to improve the well-being of their clients. They also include health, nutrition, education and literacy training. But providing financial and social services are two separate activities which may have conflicting objectives. It is for example rare for nonfinancial services to be financial sustainable. Another problem is that it might be difficult to identify and control the costs per service, which makes it difficult to measure the self-sufficiency of the financial services (Ledgerwood, 1999).

2.2.5 Performance of MFIs

From the work of Blankenhol (2007), it can be grasped that MFIs are facing a double challenge: They have to provide both financial services to the poor (outreach) and also cover their costs in order to avoid bankruptcy and to continue operating in the financial market sustainably. Hence to assess MFIs performance both dimensions must be taken into account.

As Helms (2006) shows, there are several arguments for evaluating and measuring the performance of MFIs. “Microfinance works best when it measures-and discloses-its performance. Reporting not only helps stakeholders judge costs and benefits, but it also improves performance. MFI needs to produce accurate and comparable reporting on financial performance as well as social performance” (Helms, 2006).

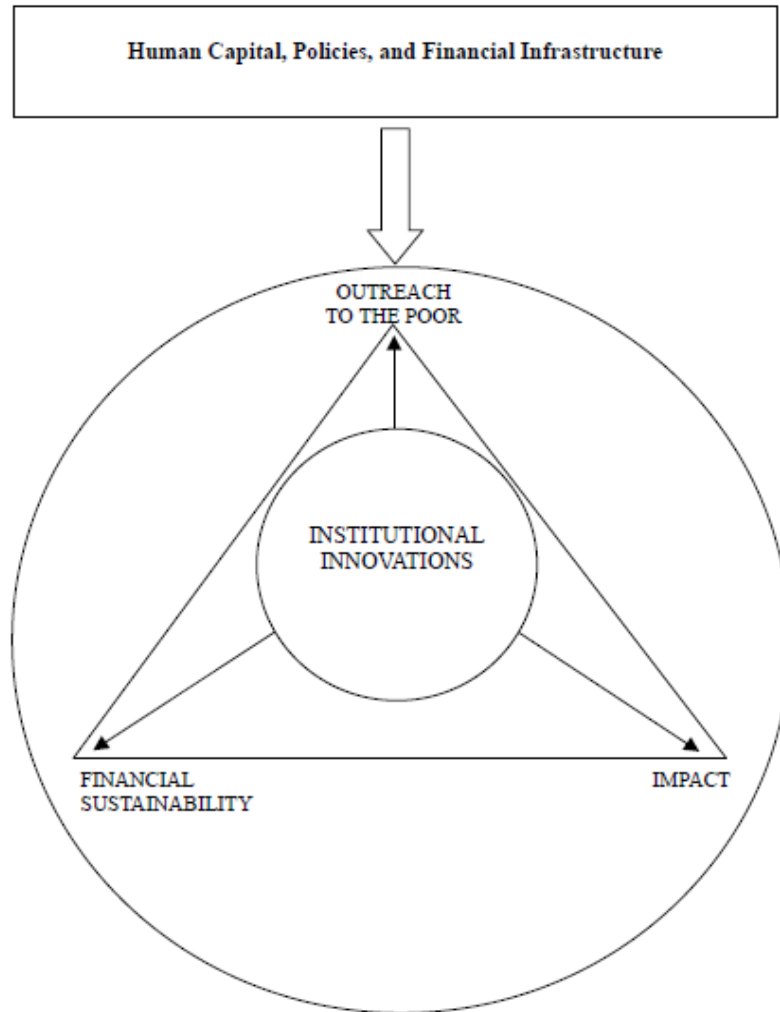
2.2.6 Evaluating MFI Performance: The Critical Microfinance Triangle

Different segments of the microfinance industry propose different criteria to evaluate performance but a consensus is emerging among analysts to evaluate the industry in terms of a critical triangle (Meyer, 2002, p. 1).

As Meyer (2002) indicates, the triangle in figure 1 below presents a conceptual framework for thinking about three overarching policy objectives: outreach to the poor, financial sustainability, and welfare impact. Performance criteria are required for each objective and all three must be measured to thoroughly evaluate microfinance performance. The inner circle in the Figure represents MFI innovations in technology, policies, organization, and management that affect how well each objective is met. The outer circle represents the environment within which

microfinance operates that also affects performance. According to Meyer (2002), this environment broadly includes the human and social capital possessed by the poor, the economic policies of the country, and the quality of the financial infrastructure that supports financial transactions. Improvements in the environment make it easier for MFIs to reach the three objectives.

Figure 1: The Critical Microfinance Triangle



Source: Meyer (2002, p. 3)

2.2.6.1 Outreach to the poor

Outreach is commonly understood as the number of clients served. But according to Navajas, Schreiner, Gonzalez-vega and Rodriguez-meza (2000) as cited in Meyer (2002) the concept of outreach is multidimensional and can be divided into four:

- The number of persons now served, which previously were denied access to formal financial services. These persons will usually be the poor because they cannot provide the collateral required for accessing formal loans, they are perceived as being too risky to serve, and impose high transaction costs on financial institutions because of small size of their financial activities and transactions.
- The number of women served: Women often face greater problems than men in accessing financial services.
- The depth of outreach is important because the poorest of the poor face the greatest access problems. So to evaluate how well the MFIs reach the very poor some measure of depth of outreach is needed.
- The variety of financial services: it has been shown that the poor demand and their welfare will be improved if efficient and secure savings, insurance, remittance transfer and other services are provided in addition to the loans that are the predominant concern of policy makers.

According to Navajas et al. (2000) there are six aspects of outreach:

- Depth is referred to as “the value that society attaches to the net gain from the use of microcredit by a given borrower” (Navajas et al., 2000, p. 6). Poverty is a good proxy for depth, because society places more weight on the poor than on the rich.
- Worth to users is how much a borrower is willing to pay for a loan.
- Cost to users is referred to as the cost of a loan to a borrower.
- Breadth is the number of users.
- Length is the time frame in which a MFI produces loans.
- Scope is the number of types of financial contracts that are offered by a MFI

2.2.6.2 Financial sustainability

Financial sustainability is another aspect when evaluating performance. Meyer (2002) states that; “The financial sustainability of MFIs is important as the poor benefit most if they have

access to financial services over time rather than receive just one future loan but denied future loans because the MFI has disappeared” (Meyer, 2002, p. 4). According to Meyer (2002) there are two levels of financial sustainability that can be measured; operational self-sustainability and financial self-sustainability. Operational self-sustainability means that operating income is sufficient to cover operating costs. Financial self-sustainability means that the MFI also can cover the costs of funds and other forms of subsidies received when valued at market rates (Meyer, 2002).

Microfinance has received a lot of attention as an important poverty alleviation tool. 2005 was by the UN declared to be the international Year of Microcredit, and in 2006 Mohammad Yunus received the Nobel Peace prize. These developments have led to high expectations about the potential poverty-reducing effects of microfinance among policy-makers and aid organizations. But, as stated in (Armendariz & Labie, 2011):

“In order to be able to make a significant and long-term contribution to reducing worldwide poverty, MFIs need to be successful in extending loans to poor borrowers, while at the same time being able to at least cover the costs of their lending activities, i.e., they may need to focus on being financial sustainable in the long run” (Armendariz & Labie, 2011, p. 174).

2.2.6.3 Impact

The last aspect in the Critical Microfinance Triangle that is measured when evaluating performance is welfare impact. Meyer (2002) defined impact assessment as; “attributing specific effects, impacts, or benefits to specific interventions, in this case, improved access to financial services” (Meyer, 2002, p. 5). One of the main objectives of MFIs is to reduce poverty. When measuring if microfinance really is a poverty alleviation tool, selecting which definition of poverty to use is required. Measuring the impact on clients of financial services is the most difficult and controversial aspect when evaluating performance, because of the methodological difficulties and high costs involved in conducting robust studies. It has been argued that the most important evidence of impact should be whether or not MFI clients continue to use the services (Meyer, 2002).

When measuring the impact or the benefits from financial services the benefits can be divided into economic and noneconomic benefits.

A. Economic benefits:

- Traditional or new investments and production activities that firms and households engage in due to additional liquidity in the form of loans received.
- Consumption smoothing and changes in firm and household balance sheets, such as holding less inventories due to the availability of additional financial resources (Meyer, 2002).

B. Noneconomic benefits:

- Empower women client in cultures where their economic and social opportunities are limited.
- Improved nutrition and hygiene, education, participation in family planning, and improved self-esteem (Meyer, 2002).

2.2.7 Microfinance Performance indicators (Determinants)

In this section, some of the most common indicators used to measure MFIs' financial performance and which can be taken as the potential determinants of financial performance of MFIs have been discussed. This literature is reviewed for the purpose of developing empirical evidence for the independent variable that the researcher think may affect the financial sustainability (ROE) of microfinance institutions in Ethiopia. There are four main categories of performance indicators: portfolio quality, efficiency and productivity, financial management and profitability (Damian et al., 2003).

2.2.7.1 Financial sustainability (profitability)

“Profitability measures, such as return on equity, return on assets and portfolio yield tend to summarize performance in all areas of the company. If portfolio quality is poor or efficiency is low, this will be reflected in profitability” (Damian et al., 2003, p. 3)

But in the same guide they also point out that all performance indicators tend to be of limited use (in fact, they can be outright misleading) if looked at in isolation and this is particularly the case for profitability indicators (Damian et al., 2003).

A. Return on Equity Ratio

According to Ledger wood (1999), the return on equity (ROE) ratio provides management and investors with the rate of return earned on the invested equity. It differs from the return on assets

ratio in that it measures the return on funds that are owned by the MFI (rather than total assets, which by definition includes both liabilities and equity). If the return on equity is less than the inflation rate, then the equity of the MFI is reduced each year by the difference (net of the non-monetary assets owned by the MFI). The return on equity ratio also allows donors and investors to determine how their investment in a particular MFI compares against alternative investments. This becomes a crucial indicator when the MFI is seeking private investors. The return on equity ratio will also vary greatly depending on the capital structure of the MFI. Those that fund their assets primarily with equity will show a lower return on equity than those that fund their assets primarily with liabilities.

2.2.7.2 Financial Management

As it has been indicated in the technical guide “Performance Indicators for Microfinance Institutions” Damian et al. (2003), financial management assures that there is enough liquidity to meet an MFI’s obligations to disburse loans to its borrowers and to repay loans to its creditors. Even though financial management is a back office function, decisions in this area can directly affect the bottom line of the institution. To measure the financial management of a MFI we can use Funding Expense, Cost of Funds and the Debt/Equity ratio as indicators (Damian et al., 2003).

A. Debt to Equity Ratio(DE)

According to Damian et al. (2003) the debt/equity ratio is the simplest and best-known measure of capital adequacy because it measures the overall leverage of the institution. The debt/equity ratio is of particular interest to lenders because it indicates how much of a safety cushion (in the form of equity) there is in the institution to absorb losses. According to Rosenberg (2009), traditionally, microfinance institutions have had low debt/equity ratios, because as NGOs their ability to borrow from commercial lenders has been limited. As MFIs transform into regulated intermediaries, however, debt/equity ratios typically rise rapidly. Risk and volatility of the MFI (exposure to shifts in the business environment, for instance) determine how much debt can be carried for a given amount of equity.

2.2.7.3 Deposit to Asset Ratio (DTA)

According to Damian et al. (2003), it is a measure of how large proportion of the assets is financed by savings. MFIs that mobilize savings can fund at least part of their lending activity by using local savings. It has also a relatively low cost of funds, because savings is a source of relatively cheap funds. Deposit mobilization, since it is a short term debt, it contributes toward the financial sustainability of MFIs. MFIs are also providing micro-saving to enable poor and low-income people to store their money safe and give them the possibility to earn a return on savings (Ledgerwood, 1999). Savings can help households to build up assets to use as collateral, it can also help them better smooth seasonal consumption needs, finance major expenditures and self-insure against major shocks.

There are two types of savings: compulsory savings and voluntary savings. Compulsory savings can be considered as part of a loan product rather than an actual savings product; it works as collateral for the loan received. There has been some criticism to compulsory savings because many of the savings accounts came with so many strings attached that they hardly looked like savings accounts (Armendariz & Morduch, 2010). The other kind of saving type is voluntary savings. This is not an obligatory part of accessing credit services, and is provided by the MIFs to borrowers and non-borrowers. Voluntary savings is a lot easier to use than compulsory savings, but it is still not optimal (Ledgerwood, 1999).

2.2.7.4 Portfolio Quality

As Rosenberg (2009) shows, portfolio quality is a crucial area of analysis, since the largest source of risk for any financial institution resides in its loan portfolio. A retail lender's ability to collect loans is critical for its success: if delinquency is not kept to very low levels, it can quickly spin out of control. Furthermore, loan collection has proved to be a strong proxy for general management competence.

A. Portfolio at Risk (PaR)

According to Rosenberg (2009), the PaR is the most widely accepted measure of portfolio quality. It shows the portion of the portfolio that is "contaminated" by arrears and therefore at risk of not being repaid; the older the delinquency, the less likely that the loan will be repaid.

Generally speaking, any portfolio at risk (PaR30) exceeding 10% should be cause for concern, because unlike commercial loans, most microcredits are not backed by bankable collateral (Damian et al., 2003)

As Rosenberg (2009) describes, portfolio at risk is a useful measure, but it does not tell the whole story as all performance measures, portfolio at risk can also be manipulated. The most common form of doing this is to write off delinquent loans. Portfolio at risk must therefore always be analyzed together with the fourth measure of portfolio quality, the write off ratio. Also, portfolio's representing very different risk profiles can have the same portfolio at risk value. For example, while the portfolio at risk measure may be the same, a loan portfolio with a large concentration of seriously delinquent loans (loans affected by arrears of more than 90 or 180 days) will be much riskier than a delinquent portfolio where arrears remain in the range between 30 and 60 days"(Damian et al., 2003).

2.2.7.5 Efficiency and Productivity Ratios

Productivity and efficiency ratios provide information about the rate at which MFIs generate revenue to cover their expenses. By calculating and comparing productivity and efficiency ratios over time, MFIs can determine whether they are maximizing their use of resources. Productivity refers to the volume of business that is generated (output) for a given resource or asset (input) while efficiency refers to the cost per unit of output (Ledgerwood, 1999).

A. Operating Expense Ratio (OER)

OER is the most widely used indicator of efficiency. It allows a quick comparison between an MFI's portfolio yields with its personnel and administrative expenses; how much it earns on loans versus how much it spends to make them and monitor them. Its substantial drawback is that it will make an MFI doing small loans look worse than an MFI doing large loans, even if both are efficiently managed. Thus, a preferable alternative is a ratio that is based on clients served, not amounts loaned (Rosenberg, 2009).

As Ledgerwood (1999) indicates, it is often argued that savings mobilization adds substantially to operating expenses, but the Micro Rate do not bear that out. Many of the most efficient MFIs mobilize savings and many of the most inefficient don't. Obviously, mobilizing savings does have a cost, but it appears that this rarely adds more than 2 to 3 percentage points to operating

expenses. The operating expenses of rural micro-lenders are obviously much higher since their clients are more widely dispersed.

B. Loan Officer Productivity

The number of active borrowers to number of credit officers is described by Ledgerwood (1999), as the ratio that captures the productivity of the institution's loan officers; the higher the ratio the more productive the institution. It is one of the most recognized performance ratios in the microfinance industry. Like the personnel productivity ratio, the loan officer productivity ratio says a fair amount about how well the MFI has adapted its processes and procedures to its business purpose of lending money.

2.2.8 Subsidy and Sustainability

As Armend´ariz and Morduch (2005) indicate, interest rates are in part rationing mechanisms (determining who chooses to borrow and who does not), and micro-lenders' interest rate policies may also affect competitors working in the same markets. Since getting more subsidies generally means that micro lenders can keep interest rates lower than otherwise, removing subsidy will, by the same token, put upward pressure on fees charged to clients. Not only that, but the degree of subsidy has implications for how staff are hired and treated, how quickly programs can expand, how large loans can grow, and so forth (Armend´ariz and Morduch, 2005).

2.2.9 Why measure performance?

Performance measurements can be used for many different purposes. MFIs performance is measured for internal and external purposes. According to CGAP microfinance works best when it measures and discloses its performance. Reporting is not just helpful for stakeholders to judge costs and benefits, but it can also improve the performance (CGAP, 2006). In order to get better at something we have to measure it, and one of the main reasons for measuring performance is to improve it. According to Simons (2000) business performance measurement is a tool to balance five major tensions within a firm:

1. Balancing profit, growth and control
2. Balancing short term results against long-term capabilities and growth opportunities
3. Balancing performance expectations of different constituencies
4. Balancing opportunities and attention
5. Balancing the motives of human behavior (Simons, 2000)

2.3 Empirical literature

There have been a number of studies investigating into the determinants of MFIs financial performance. According to Damian et al. (2003), ROE is considered as a proxy for profitability of MFIs. They indicate that many commercial financial institutions target a return on equity of about 15 to 25 percent, depending on the inflation rate in the country.

The empirical literature regarding the relationship between leverage and profitability is mixed. For instance, Abor (2005) on 'capital structure and profitability of SMEs in Ghana found a positive association between short-term debt ratio and return on equity. On the other hand, Chiang, Chang and Hui (2002), on capital structure and profitability of the property and construction sectors in Hong Kong conclude that it is negatively related to profit margins.

In 1958, Modigliani et al. found that firms with high leverage positions tend to have a capital structure that translates into a better performance. This states that high leverage and profitability are positively correlated. Nevertheless, Rhyne, Vogel and McKean (1992) observed somewhat different approach to Modigliani et al (1958); they stated that institution which has high capital structure with equity tend to be more profitable while Abor (2005) postulates that, short term debt ratio is positively correlated with return on equity.

Microfinance institutions that employ higher debt in their capital structure are more profitable, and highly leveraged microfinance institutions are more profitable. Besides, a higher debt ratio can enhance the rate of return on equity capital during good economic times (Muriu, 2011).

Evidences from empirical findings have reported mixed findings about the impact of size on firm performance not only in the Microfinance industry but also in other industries.

As Chandler (1962) indicates, the size of the firms has advantages in their performance. Large firms can have the following advantages: they can operate at low costs due to scale and scope of economies advantages; the advantage of getting access to credit finance for investment, possess a larger pool of qualified human capital and have a greater chance for strategic diversification compared to small firms. Moreover, According to Ramsay, Ong and Yeung (2005) firm size allows for incremental advantages as the size enables the firm to raise the barriers of entry to potential entrants as well as gain leverage on productivity. Among the key advantages of larger

firms as compared to smaller firms includes, higher negotiation power with clients and suppliers, easy access to finance and broader pool of qualified human capital (Cohen, 2009).

On the contrary, the size of the firm is not always of advantages as it can also result in declining performance due to some operational behavior of large firms. Firm growth beyond the optimal levels can experience negative effect performance (Barrett, Marc & Janet, 2010). Tripsas & Gavetti (2000) also argue that firm size is not always of advantages; in some cases large firms are slow to introduce and adopt new technologies due to the bureaucracy and operational rigidities. Large firms also have a tendency to focus only on existing market unlike small firms, which seek to capture new and potential markets (Christensen, 1997). The mixed results from the empirical evidences suggest that the relationship between size and performance is not linear.

A study on determinants of financial viability by Nimal (2003), defined that the operational efficiency and low administration costs have an important bearing. The relative smaller size and shorter maturity of loans drives transaction costs higher for MFIs. Nicholas et al. (2009) further asserted as higher costs (especially operating costs) justify higher rates. Reduction in operating expense ratio is primarily driven by reductions in non-personnel expenses.

Another study done on determinants of profitability and sustainability by Bourke (1989) shows that management efficiency (reduced expenses) raise the profitability of financial institutions, implying a negative relationship between operating expense ratio and profitability. Kosmidou (2008) has also found that poor expenses management to be among the main contributors to poor bank profitability.

Concerning the credit officer productivity, it is the amount of quality services delivered by microfinance officers to their clients and it quantifies the ratio of number of active borrowers to number of officers. In fact, loan officer productivity is the primary indicator to measure the productivity; the higher the ratio the productive the institution (Nagaranjan, 2001).

The empirical results indicate a negative relationship between Portfolios at risk (PaR) and profitability. The portfolio at risk measures how efficient an MFI is in making collections. The higher the PaR implies low repayment rates and therefore, less financial sustainability. Aemiro (2013) found similar relationship. Moreover a study by Nyamsogoro (2010) as cited in the former supports this negative relationship between PaR and financial performance.

2.3.1 Ethiopian Scenario

Empirical studies regarding the determinants of financial performance of MFIs in Ethiopia have been insufficient and scarce. There are only few and these have been summarized as under:

Aemiro (2013) in his study on “Determinants of Financial Sustainability of MFIs in East Africa” revealed that deposit as percentage of the loan outstanding and deposit to total asset ratio were found to be significant. Moreover, in the study made by Aemiro and Mekonnen(2012) on “the financial performance and sustainability of MFIs”, deposit to total assets ratio was found to be significant determinant of financial performance.

Concerning empirical evidence regarding debt to equity ratio, Ejigu (2009), in his study on “Performance Analysis of Microfinance Institutions in Ethiopia” using 16 MFIs as a sample, found that the use of debt financing makes firms more efficient and productive.

The empirical literature regarding the relationship between size and MFIs’ financial performance, in 2009, Ejigu reported a positive impact of size on the profitability and sustainability of Microfinance institutions in Ethiopia.

In summary, financing is a scarce factor for many poor people around the world who wish to improve their livelihood. In order for microfinance institutions (MFIs) to be able to help these people gain access to financial sources they need to be able to cover their costs and earn profits. Otherwise, it becomes hard for MFIs to achieve their goals if they are not performing well financially. Several studies have been conducted to determine the factors affecting financial sustainability of MFIs in different countries. However, the level of significance of these factors in affecting financial performance of MFIs varies with studies and countries. While some of the determinants are found to be significant in one country or economy or MFI, they may not be significant for others (Cull and Morduch, 2007). Similarly, the factors affecting the financial performance of MFIs in Ethiopia are not clearly known. Besides, the microfinance performance indicator variables used by different researchers differ from one researcher to another. The need to conduct this study is therefore to narrow the knowledge gap on the subject matter. In identifying the significant determinants of MFIs’ financial performance(ROE), capital(financing) structure, size (total asset), portfolio quality, efficiency and productivity are considered as the pre-determined potential and important factors that may significantly affect financial

sustainability (ROE) of MFIs in Ethiopia. Therefore, this study is aimed at identifying the microfinance performance indicator variables that significantly affect the financial performance (ROE) of MFIs in Ethiopia and narrowing the knowledge gap about the significant determinant factors of ROE of the Ethiopian microfinance industry.

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

3.1 Research Design

The type of research is explanatory as it establishes a relationship between the dependent and independent variables. In this study quantitative research method was employed. Secondary data (document analysis) for MFIs which was mainly obtained from the annual financial reports of AEMFI was utilized. All MFIs that are currently operating in the country were considered as population for the sample. Balanced panel data was used to generate descriptive and inferential statistics (multiple linear regressions). To check the reliabilities of the data and the OLS assumptions, regression diagnostics (tests) were also applied.

3.2 Sample and Sampling techniques

The population of the study was made up of all MFIs that are currently operating in the country and listed on the Microfinance Information Exchange (MIX Market). According to June 2013 NBE data source, there are 32 MFIs over the country. However, only 23 MFIs have been reported to MIX Market by individual MFIs and 12 out of the 23 MFIs those which had complete data were considered as a sample as they are assumed to be the representatives of the whole population.

3.3 Source of Data

To identify the factors that influence the financial performance of MFIs, secondary data was used. The researcher utilized balanced panel data on MFIs in Ethiopia for the years 2003 through 2011. Moreover, the MFIs' data for the year 2003 was collected from MIX market website. On the other hand, the data for the years 2004 through 2011 was gathered from three AEMFI bulletins while the list of the population for the sample, whom they backed by(ownership) and their date of establishment, number of branches and sub branches was obtained from NBE.

3.4 Method of Data Analysis

Quantitative analysis technique was adopted for the study. The panel data was run to generate the tests for classical assumptions, descriptive and inferential statistics (regression). To indicate the significant determinants of the financial performance of MFIs very well, nine years balanced panel data over the period 2003 to 2011 was utilized. The data has a cross-sectional data of 12 entities or subjects (MFIs) and 9 time series data (years). The balanced panel data has 108 observations with insignificant and tolerable missing values. In analyzing the data, both descriptive (mean, minimum, maximum, and standard deviation) and inferential statistics (regression) were utilized. Moreover, for testing the hypotheses, both individual and joint (F-test) hypothesis testing was used.

3.5 Variable Measurement

3.5.1 The Dependent Variable and its Measurement

Generally, as it has been indicated in Damian et al. (2003), Return on Asset, Return on Equity and Portfolio Yield are considered as measures of profitability. However, in this study, only adjusted return on equity was used as a measure of profitability for the MFIs under study.

A. Return on Equity (ROE)

ROE is a measure of paramount importance since it measures the return on their investment in the institution. It indicates the profitability of the institution and most often used as a proxy for commercial viability.

ROE is calculated by dividing net income (after taxes and excluding any grants or donations) by period average equity as follows:

$$\text{ROE} = \frac{\text{Net Income}}{\text{Average Equity}}$$

As Damian et al. (2003) indicate, ROE is a widely accepted measure of financial performance. Dissanayake (2012) also used ROE as a measure of MFIs financial performance.

3.5.2 Explanatory Variables and their Measurement

To measure the determinants of microfinance profitability, six pre-determined variables were used as independent variables which have been extracted from Damian et al. (2003) and include:

Debt/Equity (DE), Deposit to Total Asset (DTA), Portfolio at Risk (PaR >30), Operating Expense Ratio (OER), Borrowers per loan Officer (BorpLOff) and Size(total asset) of MFI. Even though age of MFIs is also considered as one of the independent variables, it was not incorporated. Because the researcher believes that age of the MFIs under consideration will not have as such significant impact as almost all the MFIs under study have almost similar age; in other words all are mature(greater than 8 years in operation) as all were established between 1997 and 2000(see Appendix A).

A. Debt to Equity ratio (DE)

According to Rosenberg (2009), debt/equity is incorporated as measure of financing structure and is calculated by dividing total liabilities by total equity using the following formula:

$$\text{Debt to equity ratio} = \frac{\text{Total debt}}{\text{Total equity}}$$

Total liabilities include everything the MFI owes to others, including deposits, borrowings, accounts payable and other liability accounts. Total equity is total assets less total liabilities. The debt to equity ratio is a common measure used to assess a firm's leverage, or in other words the extent to which it relies on debt as a source of financing (Damian et al., 2003).

B. Deposit mobilization (Deposit to Assets Ratio)

This is a measure of how large proportion of the assets that are financed by savings. Many MFIs faced liquidity problems during the financial crises, and because of rising financial costs and the fluctuations of exchange rates affects many of the MFIs who rely on external finance, many of the MFIs have started to fund at least part of their lending activity by using local savings. As stated above MFIs that can mobilize savings often have a relatively low cost of funds, because savings is a source of relatively cheap funds Micro Rate & Inter-American Development Bank (Damian et al., 2003). Deposit mobilization, since it is a short term debt, it contributes toward the financial sustainability of MFIs and it is calculated as follows:

$$\text{Deposit to Asset ratio} = \frac{\text{Total voluntary savings}}{\text{Adjusted Total asset}}$$

C. Portfolio at Risk (PaR >30)

Is a measure for the quality of the portfolio, and how well the MFI are collecting their loans (CGAP, 2006). This variable states all portfolios with more than 30 days in arrears, and therefore has a risk of not being repaid (Mersland, 2011). This will have an effect on the earnings of the MFI, and therefore it may also have a negative effect on the performance.

Portfolio at Risk can be calculated as follows:

$$\text{PaR} = (\text{Outstanding Balance on Arrears over 30 days} + \text{Total Gross Outstanding Refinanced (restructured) Portfolio}) / \text{Total Outstanding Gross Portfolio}$$
 (CGAP, 2003, p. 6).

D. Operating Expense Ratio

The Operating Expense Ratio is calculated by dividing all expenses related to the operation of the institution (including all the administrative and salary expenses, depreciation and board fees) by the period average gross portfolio. Interest and provision expenses, as well as extraordinary expenses are not included.

$$\text{Operating Expense/ Loan portfolio} = \text{Operating Expense/Average Gross Loan portfolio}$$

According to Rosenberg (2009), this ratio provides the best indicator of the overall efficiency of a lending institution. For this reason, the ratio is also commonly referred to as the efficiency ratio: it measures the institutional cost of delivering loan services; the lower the operating expense ratio, the higher the efficiency.

E. Loan Officer Productivity

As Damian et al. (2003) indicated, this ratio is calculated by dividing the number of active borrowers of an institution by the total number of loan officers. Active borrowers are defined the same way as in the personnel productivity ratio. Loan officers are defined as personnel whose main activity is direct management of a portion of the loan portfolio. It includes field personnel or line officers that interact with the client, but not administrative staff or analysts who process loans without direct client contact. Loan officers also include contract employees who may not be part of the permanent staff, but are contracted on a regular basis in the capacity of loan officer and is calculated as:

$$\text{Loan Officer Productivity} = \frac{\text{Number of Active Borrowers}}{\text{Number of Loan Officers}}$$

This ratio captures the productivity of the institution's loan officers – the higher the ratio the more productive the institution. It is one of the most recognized performance ratios in the microfinance industry. Like the personnel productivity ratio, the loan officer productivity ratio says a fair amount about how well the MFI has adapted its processes and procedures to its business purpose of lending money (Damian et al., 2003).

F. Size

Due to economies of scale the size of a firm is considered to be an important determinant of a firm's performance. "Larger, well known firms have greater access to the long term capital market than smaller unknown firms. Smaller, unknown firms tend to either borrow short term by means of bank loans, or issue stock. This explains why larger companies will lean toward debt financing and smaller firms toward equity financing" (Rao, Al-Yahyaee & Syed, 2007).

The size of an MFI is calculated by taking the natural logarithm of total assets.

The following formula is used:

$$\text{Size} = \log(\text{Total assets})$$

3.6 Model Specification

Panel data has become popular because of its ability to model time and space as well as generalize across them and it increases the number of observations (Brooks, 2008).

The nature of data used in this study enables the researcher to use panel data model which is deemed to have advantages over cross section and time series data methodology. It involves the pooling of observations on a cross-section of units over several time periods. A panel data approach is more useful than either cross-section or time-series data alone. As Brooks (2008) states the advantages of using the panel data set; first it can address a broader range of issues and tackle more complex problems. Besides, by combining cross-sectional and time series data, one can increase the number of degrees of freedom, and thus the power of the test. It can also help to mitigate problems of multicollinearity among explanatory variables that may arise if time series are modeled individually. However, this doesn't mean that panel model is free of limitation.

The main limitations of this model are heteroskedasticity and autocorrelation. These problems were also reflected in this study and were mitigated using first differencing method.

Generally the panel model has the following form:

$$Y_{it} = \beta_{1i} + \beta_2 X_{2it} + \beta_3 X_{3it} + u_{it} \quad (1)$$

Where $i = 1 \dots N$; $t = 1 \dots T$ and while Y_{it} is the dependent variable, X_{it} is the explanatory variable and, u_{it} is the error term.

3.6.1 Pooled OLS Regression Model

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \dots + \beta_k X_{kit} + \varepsilon_{it} \quad (2)$$

Where K is the number of independent variables, ε_i is a random error term with a mean value of zero and variance of σ^2_ε .

3.6.2 First Differencing Method

“A potential ‘remedy’ for autocorrelated residuals would be to switch to a model in first differences”, (Brooks, 2008, p. 154). As Brooks indicates, since the data was auto correlated, to solve the problem the first differencing method has been applied as follows:

$$\Delta y_t = \beta_0 + \beta_1 \Delta x_{1t} + \dots + \beta_k \Delta x_{kt} + u_t \quad (3)$$

Where Δy_t is denoted by $y_t - y_{t-1}$, $\Delta x_{2t} = x_{2t} - x_{1t-1} \dots$, $\Delta x_{kt} = x_{kt} - x_{kt-1}$

In analyzing the factors that affect the financial performance of MFIs, one dependent variable (ROE) and six pre-determined independent variables have been incorporated. These include debt to Equity Ratio (DE), Deposit to Total Asset (DTA), Portfolio at Risk (PaR >30), Operating Expense Ratio (OER), loan officer productivity and size of MFI. And the likely relationship between the dependent and independent variables were tested using balanced panel data covering the period of 2003-2011 using a simplified model shown below:

Reduced form of the model

$$AROE_{it} = \alpha_0 + \beta_1 (DE_{it}) + \beta_2 (DTA_{it}) + \beta_3 \log (Size_{it}) + \beta_4 (OER_{it}) + \beta_5 (PaR_{it} > 30) + \beta_6 \log (BorpLOff_{it}) + \varepsilon_{it} \quad (4)$$

Where

- $AROE_{it}$ is the ratio of MFI net income to average equity(adjusted) for firm i at time t ($i = 1, \dots, N$; $t = 1, \dots, T$);
- $\text{Log}(\text{Size})$ denotes the log value of total asset of each MFI(measure of MFI size)
- OER designates the ratio of operating expense to loan portfolio of the same.
- DE indicates the debt to equity ratio.
- DTA denotes the percentage of deposit to total asset(measure of financing structure)
- $\text{PaR}>30$ designates the portfolio at risk which represents the amount of outstanding that is not collected for more than 30 days.
- BorpLOff represents borrowers per loan officer which measures loan officer productivity.

3.7 Econometric Tests and Justifications of the Model

To identify the determinants of MFIs financial performance, multiple regression analysis was applied. The Hausman test was also applied to choose whether the Fixed Effects (FE) or Random Effects (RE) model is appropriate. Moreover, in order for the OLS estimators to be unbiased and consistent, the classical assumptions must be met. Because of this, an important part of the regression analysis was to determine whether these assumptions hold for the equation was done in this study.

3.7.1 Hausman Specification Test

In choosing between FE and RE models the study employed the Hausman test which compares the coefficients of two estimators where RE is considered consistent under null hypothesis. Thus, the test result shows that the RE provides consistent estimates compared to FE model. The Hausman test statistic was not significant and therefore, we could not reject the null hypothesis. This indicated that the RE model gives consistent results (see Appendix B).

3.7.2 Testing for random effects: Breusch-Pagan Lagrange multiplier (LM)

The study further checked the appropriateness of using the RE model as opposed to simple (pooled) OLS using the Breusch and Pagan Lagrange Multiplier (LM) test. The LM test helps us decide between a RE regression and a simple (pooled) OLS regression. The null hypothesis in the LM test is that variances across entities are zero. This is no significant difference across

units (no panel effect). Since the LM test was not significant we failed to reject the null and conclude that RE wouldn't have been appropriate (see Appendix B1). This is no evidence of significant differences across entities (MFIs). Therefore, we run a simple OLS regression.

3.8 Testing the Classical Assumptions

3.8.1 Test of Multicollinearity

Tolerance means the percentage of variance in a variable not associated with other variables. Tolerance has a range from zero to one. A value of near one indicates independence; if the tolerance value is close to zero, the variables are multicollinear. As a rule of thumb, a tolerance of less than 0.20 indicates a problem with multicollinearity (Kellogg School of Management, 2004). From the result of the study, we can observe that all the tolerance values are between 0.4 and 0.9; a commonly given rule of thumb is that VIFs of 10 or higher (or equivalently, tolerances of 0.10 or less) may be reason for concern. However, as can be seen from Appendix D1, the result indicates lower than the critical value. Therefore, multi-collinearity is not a problem. In other words, all the variables on the study act independently.

3.8.2 Autocorrelation (serial correlation)

The researcher has taken into consideration the Wooldridge test for autocorrelation instead of the Durbin-Watson test for serial correlation of models as the Durbin-Watson test is not efficient for higher autocorrelation tests. As can be seen from the Wooldridge test result under Appendix D2, we fail to reject the null hypothesis of no serial correlation as the p-value is greater than 10%. Therefore, we conclude that serial correlation is not a concern for the study.

3.8.3 Heteroskedasticity Test

We need to test results of our model for heteroskedasticity as its presence in the regression analysis produces results that lead us to make erroneous inferences. To avoid this, the Breusch-Pagan/Cook-Weisberg test was used and the test result shows the existence of constant variance. The null is homoscedasticity (or constant variance). So, we fail to reject the null and conclude no problem of hetroskedasticity (see Appendix D3).

3.8.4 Model Specification Error Test

If misspecification' error has been committed by using an inappropriate functional form for example, if the relationship between dependent and the explanatory variables was a non-linear one, but the researcher had specified a linear regression model, this may again induce the residuals from the estimated model to be serially correlated. For the specification error, the null hypothesis that there is no specification error was tested and since the hat square was not significant, we fail to reject the null hypothesis and conclude that our model is correctly specified (see Appendix D4).

CHAPTER FOUR

4. RESULTS AND DISCUSSIONS

4.1 Results

This chapter deals with the results of the study which include the descriptive statistics, and econometric results of the model. The empirical evidence on the determinants of MFIs' profitability or Return on Equity is based on balanced panel data, where all the variables are observed for each cross-section and each time period. And summary of the descriptive statistics results are presented as follows:

4.1.1 Descriptive statistics

Table 1: Summary of Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROE	107	0.0150467	.2425041	-1.5	.98
DE	108	2.220262	2.240204	-.14	11.15
DTA	104	0.1785577	0.1625131	0	1
OER	108	0.1039907	.071109	-.15	.38
PaR>30	106	0.0623774	.0728966	-.05	.35
Asset(in ETB)	108	316,583,425.46	674,549,688.74	330,888.00	3,279,192,202.00
Loan Officer Productivity	108	456.25	277.78	121.00	1840.00

Table 1 above reports the descriptive statistics of the variables included in the analysis including their mean, standard deviation, minimum and maximum values for the sample of 12 MFIs during the period 2003-2011.

A. Return on Equity:

As indicated in table1, the mean value of ROE for the MFIs under study is 0.02; while the minimum and maximum value is -1.5 and 0.98 respectively. The standard deviation for this variable is also relatively high (0.243) which is an indication of the existence of dispersion in the performance of microfinance institutions under consideration.

B. Debt to Equity:

The mean value of debt to equity ratio is 2.22; and this indicates that most of the MFIs are highly leveraged. The minimum value of debt to equity is -.14; while the maximum value is 11.15 with standard deviation of 2.24 and this shows the existence of huge variation in terms of leverage among the MFIs in the sector.

C. Portfolio at Risk:

The mean value of portfolio at risk is 0.062; and this shows that approximately 6.2 percent of the MFIs loan portfolio that are 30 days or more overdue. The minimum and maximum value is -.05 and 0.35; and this also indicates wide dispersion among the portfolio quality of the MFIs. The older delinquency is, the less likely it is that the loan will be repaid.

D. Deposit to Assets:

The mean value of the voluntary savings as percentage of total assets is 0.18 indicating that approximately 18 percent of the MFIs assets are financed by savings. The minimum and maximum values are 0 and 1 respectively. So there is quite a spread amongst the MFIs.

E. Size:

The variable asset under study is used to measure the size of MFI. The mean value of total asset for the MFIs under consideration is 316,583,425.46 ETB. While the minimum and maximum value of totals assets is worth of 330,888.00 and 3,279,192,202.00 ETB respectively. The standard deviation for the variable under study is 674,549,688.74 ETB. So there is a wide spread among the MFIs in terms of total asset which is a measure of their size.

F. Operating Expense/Gross loan portfolio:

This ratio provides the best indicator of the overall efficiency of a lending institution. As it measures the institutional cost of delivering loan services. The lower the operating expense ratio, the higher the efficiency; as can be observed from table1 above, the mean value of OER is 0.104; and this indicates, on average, a 10 cent was spent as operating expense to deliver one birr while the minimum and maximum value is -0.15 and 0.38 respectively. And this shows the existence of a wide dispersion among the MFIs in terms of operating expense ratio.

G. Borrowers per loan Officer:

As indicated in table 1 above, we can grasp that the mean value of MFIs' loan officer productivity is 456(client per credit officer); while the minimum and maximum value is 121 and 1840 respectively. The standard deviation for this variable is also relatively high (277) which is an indication of the existence of dispersion in the performance (productivity) of microfinance institutions under study.

4.1.2 Econometric Results

Table 2: OLS regression results

Variable	Coefficients	t-value	p-value
Intercept	-0.0037236	0.18	0.858
DE	-0.0563834	-4.12	0.000**
Deposit to Asset	-0.2478162	-8.81	0.000**
Operating Expense Ratio	-0.2478162	-0.60	0.550
Portfolio at Risk (PaR >30)	0.241932	0.82	0.416
Total asset(log)	0.0376375	2.77	0.007**
Borrowers per Loan Officer(log)	0.0644457	1.16	0.248
R ²	0.5546		
Adj R ²	0.5279		
F-test(20.76)	0.0000		
Observations	107 ¹		

**Significant at 1%

Dependent variable: ROE(adjusted)

As the econometric analysis results presented in table 2 indicates, the value for the adjusted R-squared in the model is 0.53 which implies that 53% of the variation in the dependent variable is explained by the independent variables in the model. And this designates that about 47% of the variations in the dependent variable is not explained by the independent variables included in the model. Though the model specification seems to have limited explanatory power, the F-statistics (20.76) with p-values of 0.0000 proves that it is good fit and significant.

The capital structure (DE) variable here represents the percentage of debt to equity. The result from the econometric analysis indicates the variable has a negative and statistically significant impact on financial performance at 1% level. This implies that the combination of various

¹ The number of observation is 107(108-1) due to first differencing method (Brooks, 2008, p. 154).

sources of capital of microfinance institutions did not improve their performance in the period covered in this study. And thus, the negative coefficient indicates that the more MFI is debt financed compared to other sources of finance, the more they will be unprofitable.

In other words, equity financing improves financial performance.

On the other hand, the result of study demonstrates that total assets (log) have positive statistically significant relation with ROE at 1% level; where the natural logarithm of total assets measures the size of the MFIs. Holding other things constant, this implies that a 1% increase/decrease in log of total asset would result in a 4% increase/decrease in ROE of the MFIs under study. The empirical literature regarding the relationship between size and profits are mixed. More or less similar to this finding, Janner (2012) in his work found that a positive significant effect of MFIs size on return on assets.

Once more the study result affirmed that, loan officer productivity measured by borrowers per loan officer (log) was found to have positive association with the outcome variable. The coefficient value of the loan officer productivity is in the expected direction of the researcher for the model. This result is also consistent with the empirical literature. In the work of Sekabira (2013), number of borrowers per credit officer was found to be significant and positively associated with financial self-sustainability. In fact, this is more or less similar to the findings of Rosenberg (2009). This demonstrates that the higher the ratio the more productive the institution. However, since the p-value is greater than 10%, it is not conclusive.

The other independent variable included in the analysis is deposits to total assets. The coefficient of this variable is negative and significant at 1% level. Though it is difficult to give any conclusive reason as to why the sign of this variable is opposite to the expected one.

Portfolio at risk on the other hand has a positive relation with the dependent variable of study which is opposite to the expected sign. In fact, it is not conclusive since its p-value is 0.42 which is greater than 10%. This implies the explanatory variable under consideration is not statistically significant to explain the outcome variable. Thus, from the result it can be inferred that this variable does not have any statistically significant effect on the outcome variable of the model though it is difficult to give any conclusive reason as to why the sign of this variable is opposite to the expected sign and theory.

Operating expense to gross loan portfolio is also another variable that could influence MFIs' financial performance. This coefficient is as expected negative, indicating negative relationship with MFIs' profitability but it is not conclusive as p-value is not significant.

4.2 Discussions

ROE is one of the commonly used indicators to measure the ability to continue operating in the future. The return to equity ratio indicates MFI's ability to build equity which includes not only the return on portfolio, but also all other revenue generated from investments in other operating activities.

Generally, the mean value of ROE for the MFIs under study is 0.02 while the average value for all Ethiopian MFIs is 0.06; basically, following the de Sousa-Shields and Frankiewicz (2004) life cycle stages, the Ethiopian MFIs are categorized into three groups that include the new (less than or equal to 4 years old) and young (between and equal to 5 and 8 years old) and mature (greater than 8 years old). By the way as it has been clearly stated in the methodology part, unfortunately all the participants are under the age category of mature. On the other hand, the minimum and maximum value is -1.5 and 0.98 respectively. The standard deviation for this variable is also relatively high (0.243) which is an indication of the existence of dispersion in the performance of microfinance institutions under consideration. And this points out the existence of unprofitable MFIs; though comparatively this is still by far better than the average ROE for African MFIs (-0.02) (Micro Banking Bulletin, 2008). In fact, theoretically the higher the ROE the better; but a higher ROE does not necessarily mean better financial performance as the higher ROE can be the result of high financial leverage.

With regard to debt to equity ratio, the result points out that the Ethiopian MFIs use approximately more than twice more debt financing than equity. Generally, the type of debt that the Ethiopian MFIs use and depend on is long term debt than on short term debt and equity

Concerning the portfolio quality, 6.2 percent of the MFIs loan portfolio that are 30 days or more overdue. Any portfolio at risk (PaR>30) exceeding 10 percent should be a cause for concern, because unlike commercial loans, most of the MFIs are not backed by bankable collateral (Damian et al., 2003). However, according to Micro Banking Bulletin (2008), this is below the average portfolio at risk (PaR>30) for African MFIs which is 8 percent. So, this will not be as

such a source of concern as compared to the average African MFIs default rate as well as with that of critical value (10 percent) though more can be done.

As far as the mean value of deposit to asset ratio is concerned, approximately 18 percent of the MFIs assets are financed by savings. Generally, voluntary saving can play a great role in increasing financial sustainability and enhancing lending capacity of MFIs as this is a cheap source of funds as compared to the interbank market. However, the lower cost of funds may be sometimes offset due to higher mobilizing and administering small deposits (Damian et al., 2003).

When we look at the variable asset which is used to measure the size of MFIs, though the MFIs under consideration are more or less in the same age category, the minimum value is expressed in terms of hundred thousand of ETB as compare to maximum value which is expressed in billions of ETB. The standard deviation for the variable indicates the existence of wide dispersion which in turn may contribute to their financial performance due to economies of scale.

Using operating expense/gross loan portfolio which is considered as a measure of efficiency of lending institutions, the average operating expense to deliver one birr is almost 10 cents. Generally, the lower the operating expense ratio, the higher the efficiency.

As it has been indicated in the technical guide for MFIs, loan officer productivity is measured by the ratio of number of active borrowers to number of loan officers. This ratio captures the productivity of the institution's loan officers; the higher the ratio the more productive the institution. It is one of the most recognized performance ratios in the microfinance industry. Similar to that of the personnel productivity ratio, the loan officer productivity ratio says a fair amount about how well the MFI has adapted its processes and procedures to its business purpose of lending money. From the result it can observed that the mean value of MFIs' loan officer productivity is 456(client per credit officer), while the minimum and maximum value is 121 and 1840 respectively. The standard deviation for this variable is also relatively high (277) and this points out that the existence of wide spread in the performance (productivity) of microfinance institutions under study.

To examine and assert the significant determinants of MFIs financial performance, OLS regression model was applied. The value for the adjusted R-squared in the model is 0.53 which

endorses that (53%) of the variation in the dependent variable is explained by the independent variables of the model. It also implies that about 47% of the variations in the dependent variable are not explained by the independent variables included in the model. In fact, as cited in Ganka (2010) and Asnakew (2012), Cameron (2009) expresses that for panel data; the R-squared above 0.2 is still large enough for reliable conclusions. Moreover, the F- statistics (20.76) with p-values of 0.000 indicates that the model is good fit and significant endorsing the validity and stability of the model.

When we see the individual effect of the independent variables under study, the result demonstrates that total assets (log) have a positive statistically significant association with ROE at 1% level. This positive relationship shows that the size of the MFI has significant positive effect on profitability. The results obtained by the literature for the relationship between size and profits are mixed. Large firms can operate at low costs due to scale and scope of economies advantages. Yang & Chen (2009) as indicated in Sumit (1997) argues that large firms can have the advantage of getting access to credit finance for investment, possess a larger pool of qualified human capital and have a greater chance for strategic diversification compared to small firms. Moreover, as Ramsay et al. (2005) shows, firm size allows for incremental advantages as the size enables the firm to raise the barriers of entry to potential entrants as well as gain leverage on productivity and higher negotiation power with clients and suppliers.

On the other hand, in 2000, Tripsas & Gavetti indicated that firm size is not always of advantages; in some cases large firms are slow to introduce and adopt new technologies due to the bureaucracy and operational rigidities. Moreover, large firms have a tendency to focus only on existing market unlike small firms. Similarly, in the study made by Sumit (1997) using a sample of 1020 Indian firms to examine whether size of firms influenced firms' profitability, larger firms were found to be less profitable. Holding other things constant, the study result implies that a marginal change in log of total asset would result in the ROE ratio by 4%. The implication is that when the size of the MFIs gets large, the probability to reap the advantages that large firms get would be high not understating the disadvantages of being large in size.

The other independent variable included in the analysis is deposits to total assets. The coefficient of this variable is negative and significant at 1% level. Though it is difficult to give any conclusive reason as to why the impact of this variable is opposite to the expected sign, perhaps,

this effect may come basically from the argument: “MFIs that can mobilize savings tend to have relatively low cost of funds. However this advantage is offset to some extent by the higher administrative cost of mobilizing savings” (Damian et al., 2003). In fact, Janner (2012) also found a negative association between saving to asset ratio and return on asset at 1% level of significance.

Once more the study result affirmed that, loan officer productivity measured by number of active borrowers to number of loan officers (log) was found to have a positive relation with ROE. The coefficient value of the loan officer productivity is in the expected direction of the researcher for the model. This result is consistent with the empirical literature. In the work of Sekabira (2013), the number of borrowers per credit officer was found to be significant and positively associated with financial self-sustainability. This demonstrates that the higher the ratio the more productive the institution. And this finding is more or less similar to earlier study made by Rosenberg (2009). However, it is not conclusive since its p-value is greater than 10%.

Portfolio at risk (PaR) is another variable that could influence MFIs’ financial performance. The portfolio at risk measures how efficient an MFI is in making collections. The higher the PaR implies low repayment rates and therefore, less financial sustainability. However, the result found is positive which is in contrary to the expected sign and this result is inconsistent with the empirical literature. For instance Aemiro (2013) found negative relationship between PaR and financial sustainability. In fact, it is not conclusive since the result is not statistically significant to explain the outcome variable as its p-value is greater than 10%.

On the other hand, debt to equity ratio shows negative relationship with the explained variable at 1% level of significance. This may be because increased exposure to credit risk lowers profits. This indicates that with more loans the chances of return on equity will be low as debt repayment will have its own impact on the profitability of the MFIs.

The empirical result regarding the relationship between leverage and firm’s profitability is mixed. A number of studies provide empirical evidence supporting a positive relationship between debt level and firm’s profitability (Berger and Bonaccorsi-diPatti, 2006). Moreover, these findings supported that high leverage is related to higher profit efficiency. Abor (2005) also postulates that, short term debt ratio is positively correlated with return on equity. Modigliani et al. (1958) in their study on “the impact of leverage on financial performance” also

argue that firms with high leverage positions tend to have a capital structure that translates into a better performance. This states that high leverage and profitability are positively correlated. On the other hand, empirical results also revealed a negative relationship between debt level and firm's performance or profitability (Rajan and Zingales, 1995; Wald, 1999; Booth et al., 2001; Fama and French, 2002) as cited in Aemiro (2013). Aemiro (2013) also found that negative association between leverage and profitability but statistically insignificant. The possible reason could be due to the impact of debt repayment and costs associated with in favor of outreach at the expense of profitability as the MFIs primary establishment is not for profit making only. The other variable that negatively related to ROE is the ratio of operating expense to gross loan portfolio. This coefficient is as expected negative, indicating a negative relationship with MFIs' profitability. This result is also consistent with those reported in Aemiro (2013). Moreover, Kosmidou (2008) indicated that poor expenses management to be among the main contributors to poor financial institutions' profitability but the relation is not conclusive as the p-value is not significant.

CHAPTER FIVE

5. SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

The findings of this study are mainly based on balanced panel data collected from 12 MFIs for 9 years. The aim of the study was to identify the determinants of MFIs' financial performance using pre-determined financial performance indicator variables. In analyzing the data econometric diagnostics, descriptive statistics and multiple linear regressions were used. The Hausman specification test was also used to determine whether the model is to be FE or RE. The test result indicated that the RE provides consistent estimates compared to FE model and the random effect panel model was found to be appropriate. The study further checked the appropriateness of using the RE regression as opposed to simple (pooled) OLS regression using the Breusch and Pagan Lagrange Multiplier (LM) test. And based on the test result the simple (pooled) OLS regression was found to be appropriate. While applying the OLS regression, problem of autocorrelation was observed; and the problem was solved using the first differencing method.

Concerning the descriptive statistics result, the standard deviation for the values of the variables included in the study indicates a wide dispersion among the MFIs under consideration.

With regard to the result of multiple linear regressions analysis, out of the six independent variables which were incorporated in the study and regressed over the dependent variable (ROE), three of them were found to be statistically significant; namely, debt to equity ratio, deposit to total asset ratio and log of total asset. Therefore, based on the result, these variables can be taken as the statistically significant determinants of the MFIs financial performance. However, operating expense to gross loan portfolio, portfolio at risk and loan officer productivity were not found to be statistically significant to explain the dependent variable.

5.1.1 Hypothesis Testing

Hypothesis testing was conducted to test the null hypothesis that coefficients do not have any effect on ROE individually as well as jointly (F-test). This is to test if the hypotheses which have been already proposed are in line with the actual results. Based on the individual

hypothesis testing, the hypothesis related to the size of MFIs was found to be significant and in the same direction with the actual result. Debt to equity and deposit to assets ratio were expected to have a positive sign but the result shows a statistically significant negative effect which is in opposite direction to what was hypothesized (see Appendix F1).

On the other hand, loan officer productivity and operating expense ratio were found to have a positive and negative sign respectively. And this is in the same direction to what had been proposed though they are not significant. Portfolio at risk was also expected to have negative association with the outcome variable but the actual sign was found to be positive and insignificant which is in opposite direction to what had been assumed.

The joint test (F-test) was also used to test the null hypothesis that all the coefficients do not have any effect on the dependent variable. And since the p-value is 0.0000, we reject the null and conclude that all have indeed a significant effect on the explained variable (see Appendix F2).

Table 5: Summary of the OLS regression results and hypothesis testing

Variable	ROE		
	Significance of $\hat{\beta}$	Direction	Hypothesis
DE	Significant	-	-**
DTA	Significant	-	-**
PaR>30		+	+
OER		-	-
Asset(log)	Significant	+	+**
BorpLOff(log)		+	+
R-squared	0.55		
Adj R-squared	0.53		
Prob > F	0.0000		
Observation	107		

** are statistically significant at 1% level

5.2 Conclusion

The objective of the study is to assert the significant determinants of financial performance (Adjusted Return on Equity) of MFIs in Ethiopia. Balanced panel data for 12 MFIs consisting of 108 observations, covering the period 2003 – 2011 was utilized. This provided the basis for the econometric analysis. The criteria used for choosing the institutions under study were the availability and quality of data for the time period under consideration. The study's findings under OLS regression analysis led to the conclusion stating that debt to equity ratio measured by total liabilities to total equity, natural logarithm of total asset which is a proxy for size of MFIs and deposit as percentage of total asset measured by voluntary saving as percentage of total asset are found to be statistically significant predictor variables in determining return on Equity of MFIs in Ethiopia. Moreover, the adjusted R-squared value of the regression analysis indicates that 53% of fitness can be observed in the sample regression lines for the model. And this percentage of the model implies that 53% of the total variation in the Return on Equity is explained by the independent variables (Debt/Equity Ratio, Total Asset(log), Deposit to Asset ratio, loan officer productivity Ratio(log), Operating Expense Ratio and Portfolio at risk>30 and) jointly.

The results indicate that MFIs' ROE is positively and significantly influenced by MFI size; whereas negatively and significantly by that of debt to equity ratio and deposit as percent of assets. Thus, based on the result, for MFIs' financial performance, we can deduce that size, debt to equity ratio and deposit as percent of assets do matter. This implies that, by influencing these factors (variables), the MFIs could be able to improve their financial performance. Thus, size of MFI, debt to equity ratio and deposit as percent of asset are important determinants of MFIs' financial performance in Ethiopia.

Generally, from the result of the study, it can be concluded that higher total assets may lead to higher profits. The positive coefficient of size significant at 1% level indicates that this relation might be positive due to economies of scale. However, the negative sign of debt to equity ratio may imply that higher loans contribute towards lower profitability. Exceptional finding which is inconsistent to most of the theoretical and empirical literature is the negative relationship between deposits to total assets and profitability since this is considered as cheap source of funds. In fact, as Damian et al. (2003) indicate this lower cost of funds may be sometimes offset due to higher mobilizing and administering small deposits. The positive association between

portfolio at risk and profitability is also unusual as it contradicts with the theoretical and empirical literature.

In summary, according to the result of this data, it can be inferred that total assets (log), debt to equity and deposits to total assets ratio are the major internal profitability determinants of MFIs in Ethiopia. Moreover, these have been proved using both individual and joint (F-test) hypothesis testing and were found to be statistically significant.

5.3 Limitations

In addition to the limited time and finance, there were also technical challenges faced in the research process. This study focused only on the financial performance of microfinance institutions; it did not cover outreach and impact. Lack of access to very recent data (2012) due to delay in auditing was also another challenge. Due to this the researcher couldn't incorporate the recent one in the panel data and was forced to use only 9 years data. The data have a certain sample selection bias because of the need for balanced panel data for easy comparison purpose; only 12 MFIs as case studies that fulfilled this criteria and had complete data from 2003-2011 were incorporated. And unfortunately all the selected MFIs were mature while the MFIs which are under the category of New and Young were excluded. Because of this, it is important to be aware of the fact that there might be some differences among these categories. However, this does not compromise the quality and reliability of the data.

The performance of MFIs can be measured in several ways and by a number of different variables, but this study used only adjusted return on equity as performance measure of MFIs. So, further studies could include more or different dependent variables.

The following further researches can also be extended to explore the above findings especially the negative relationship between deposit to total asset and ROE; and the positive association between portfolio at risk and the dependent variable; further studies could also be done on: the impact of type of ownership and firm age on MFIs financial performance using unbalanced data; and the effect of subsidies and grants on financial sustainability of MFIs.

5.4 Policy Recommendations

To enhance the financial performance of MFIs, several aspects need to be improved. Accordingly, the following are recommendations that are consistent with the findings in this study.

- The results indicate that MFIs' ROE is positively and significantly influenced by MFI size; so they have to increase their sizes by selling more shares so as to benefit from the scope and scale of economies.
- The government has to encourage MFIs that mobilize deposits and use borrowing only as a supplement to deposits, in order to avoid excessive dependence on public and international lenders.
- The MFIs under study are highly leveraged. The more they are debt financed compared to other sources of finance, the more they will be unprofitable due to debt repayment. Thus, to improve their financial performance they have to tend to equity financing.
- MFIs have to increase their productivity by increasing their number of active borrowers per loan officer.
- Infrastructure must be expanded to the rural areas since poor infrastructure contributes a lot to operating expenses and this may force the MFIs to either increase their interest rate so as to cover their costs which in turn exclude the poor from using borrowings or operate at loss.
- MFIs have to increase their gross loan portfolio to reduce their cost of delivering loan services which in turn increases their efficiency.

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APPENDICES

Appendix A: List of MFIs taken as a sample

MFI Name		year Establishment	Type of Ownership (backed by)
1	Amhara Credit and Savings Institution(ACSI)	09/04/1997	Regional government
2	Addis Credit and Savings Institution (ADCSI)	27/04/2000	Regional government
3	African Village Financial Service (AVFS)	16/11/1998	NGO
4	Dedebit Credit and Savings Institution (DECSI)	28/04/1997	Regional government
5	Gasha Micro-Finance S.Co.	15/05/1998	NGO
6	Meklit Micro-Finance S.Co.	16/02/2000	NGO
7	OMO Micro-Finance S.Co.	01/10/1997	Regional government
8	Oromia Credit and Savings Share company(OCSSCO)	04/08/1997	Regional government
9	Poverty Eradication & Communication Empowerment MFI S.Co.(PEACE)	18/11/1999	NGO
10	Specialized Financial & Promotional Institution(SFPI)	25/11/1997	NGO
11	Wassassa Micro-Finance S.Co.	20/09/2000	NGO
12	Wisdom Micro-Finance S.Co.	17/06/1998	NGO

Source: NBE, 2013

Appendix B: Hausman Specification Test

xtreg ROE DE DTA OER PaR logAsset logBor pOf , fe

❖ Fixed-effects (within) regression

Number of obs = 103

Group variable: MFID

Number of groups = 12

R-sq: within = 0.3115

Obs per group: min = 7

between = 0.0571

avg = 8.6

overall = 0.2172

max = 9

F(6, 85) = 6.41

corr(u_i, Xb) = -0.2990

Prob > F = 0.0000

ROE	Coef .	Std. Err .	t	P> t	[95% Conf. Interval]	
DE	.0597195	.0226369	2.64	0.010	.0147113	.1047277
DTA	-.2557712	.1322234	-1.93	0.056	-.5186668	.0071243
OER	1.170371	.5253919	2.23	0.029	.1257514	2.214991
PaR	.4949782	.398935	1.24	0.218	-.2982114	1.288168
logAsset	.0551008	.0131808	4.18	0.000	.0288939	.0813078

```

logBor pOf f | .0161649 .0585459 0.28 0.783 -.10024 .1325699
_cons | -1.149635 .3969354 -2.90 0.005 -1.938849 -.3604214
-----+-----
sigma_u | .11498178
sigma_e | .18505833
rho | .27852404 (fraction of variance due to u_i)
-----

```

F-test that all u_i=0: F(11, 85) = 2.08 Prob > F = 0.0304

. estimates store fixed

. xtreg ROE DE DTA OER PaR logAsset logBor pOf f, re

❖ **Random-effects GLS regression** Number of obs = 103

Group variable: MFID Number of groups = 12

R-sq: within = 0.2870 Obs per group: min = 7

between = 0.3197 avg = 8.6

overall = 0.2830 max = 9

Random effects u_i ~ Gaussian Wald chi2(6) = 38.03

corr(u_i, X) = 0 (assumed) Prob > chi 2 = 0.0000

ROE	Coef.	St d.	Err.	z	P> z	[95% Conf. I nt er val]
DE	.050777	.0186114		2.73	0.006	.0142993 .0872547
DTA	-.2284914	.1287831		-1.77	0.076	-.4809017 .0239189
OER	.9091653	.4373152		2.08	0.038	.0520433 1.766287
PaR	.0327736	.3303669		0.10	0.921	-.6147337 .6802809
logAsset	.0446664	.0118181		3.78	0.000	.0215033 .0678295
logBor pOf f	.081869	.0459252		1.78	0.075	-.0081427 .1718808
_cons	-1.311028	.3392818		-3.86	0.000	-1.976008 -.6460475

sigma_u | .05307866
sigma_e | .18505833
rho | .0760131 (fraction of variance due to u_i)

. estimates store random

. hausman fixed .

----- Coefficient s -----				
	(b)	(B)	(b - B)	sqr t (di ag(V_b - V_B))
	fixed	random	Di f f er ence	S. E.
-----+-----				
DE	. 0597195	. 050777	. 0089425	. 0128858
DTA	- . 2557712	- . 2284914	- . 0272798	. 0299656
OER	1. 170371	. 9091653	. 2612059	. 2911907
PaR	. 4949782	. 0327736	. 4622047	. 223622
logAsset	. 0551008	. 0446664	. 0104344	. 0058366
logBor pOf f	. 0161649	. 081869	- . 0657041	. 0363111

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\chi^2(6) = (b - B)' [(V_b - V_B)^{-1}] (b - B)$$

= 4.20
 Prob>chi 2 = 0.6492
 (V_b-V_B is not positive definite)

Appendix B1: Testing for random effects: Breusch-Pagan Lagrange multiplier (LM)

xtreg ROE DE DTA OER PaR logAsset logBor pOf, re

Random-effects GLS regression	Number of obs =	103
Group variable: MFID	Number of groups =	12
R-sq: within = 0.2870	Obs per group: min =	7
between = 0.3197	avg =	8.6
overall = 0.2830	max =	9
Random effects u_i ~ Gaussian	Wald chi 2(6) =	38.03
corr(u_i, X) = 0 (assumed)	Prob > chi 2 =	0.0000

ROE	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
-----	-------	-----------	---	------	------------------------

-----+

DE		.050777	.0186114	2.73	0.006	.0142993	.0872547
DTA		-.2284914	.1287831	-1.77	0.076	-.4809017	.0239189
OER		.9091653	.4373152	2.08	0.038	.0520433	1.766287
PaR		.0327736	.3303669	0.10	0.921	-.6147337	.6802809
logAsset		.0446664	.0118181	3.78	0.000	.0215033	.0678295
logBor pOf f		.081869	.0459252	1.78	0.075	-.0081427	.1718808
_cons		-1.311028	.3392818	-3.86	0.000	-1.976008	-.6460475

-----+-----

sigma_u | .05307866

sigma_e | .18505833

rho | .0760131 (fraction of variance due to u_i)

Breusch and Pagan Lagrangian multiplier test for random effects

xttest0

$$ROE[MFIID, t] = Xb + u[MFIID] + e[MFIID, t]$$

Estimated results:

	Var	sd = sqrt(Var)

```

-----+-----
ROE | .0508305 .2254562
e | .0342466 .1850583
u | .0028173 .0530787

```

Test: Var(u) = 0

chi 2(1) = 0.88

Pr ob > chi 2 = 0.3475

Here we failed to reject the null and conclude that a random effect is not appropriate. This is, no evidence of significant differences across entities (MFIs), therefore we can run a simple OLS regression.

Appendix C: Results of the OLS Regression

```
reg ROE DE DTA OER PaR l ogAsset l ogBor pLOf
```

Source	SS	df	MS	
Mdel	5.74901765	6	.958169609	Number of obs = 107
Resi dual	4.6162407	100	.046162407	F(6, 100) = 20.76
Tot al	10.3652584	106	.097785456	Pr ob > F = 0.0000
				R- squar ed = 0.5546
				Adj R- squar ed = 0.5279
				Root MSE = .21485

```

-----+-----
ROE | Coef . Std. Err . t P>|t| [ 95% Conf . I nt er val ]
-----+-----

```

DE	- .0563834	.0136887	-4.12	0.000	- .0835414	- .0292255
DTA	- .2544866	.0288719	-8.81	0.000	- .3117676	- .1972056
OER	- .2478162	.4136226	-0.60	0.550	-1.068432	.5727993
PaR	.241932	.2963959	0.82	0.416	- .3461089	.8299729
logAsset	.0376375	.0136104	2.77	0.007	.0106349	.0646401
logBor pLOf	.0644457	.0555036	1.16	0.248	- .045672	.1745633
_cons	- .0037236	.0207749	-0.18	0.858	- .0449403	.0374932

Appendix D: Results of Econometric Tests

Appendix D1: Multicollinearity

vif		
Variable	VIF	1/VIF
-----+-----		
OER	1.71	0.583669
logAsset	1.64	0.611447
DTA	1.30	0.771673
PaR	1.16	0.862514
logBor pLOf	1.14	0.873597
DE	1.05	0.955972
-----+-----		
Mean VIF	1.33	

NB: A vif > 10 or a 1/vif < 0.10 indicates trouble.

Appendix D2: Autocorrelation Test

xtserial ROE DE DTA OER PaR logAsset logBor pLOf

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1, 11) = 0.341
Pr ob > F = 0.5708

Appendix D3: Heteroskedascity Test

(NB: Regression results are omitted for economies of space)

estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of ROE

chi2(1) = 0.68

Pr ob > chi2 = 0.4094

The null is homoscedasticity (or constant variance). So we fail to reject the null and conclude there is no heteroskedasticity problem.

Appendix D4: Regression specification error

Linkt est

Source	SS	df	MS			
Mdel	5.75028582	2	2.87514291	Number of obs =	107	
Residual	4.61497254	104	.044374736	F(2, 104) =	64.79	
Tot al	10.3652584	106	.097785456	Pr ob > F	= 0.0000	
				R- squar ed	= 0.5548	
				Adj R- squar ed	= 0.5462	
				Root MSE	= .21065	

ROE	Coef.	St d. Err.	t	P> t	[95% Conf. Interval]	
_hat	1.001457	.0882778	11.34	0.000	.8263991	1.176515
_hat sq	-.0128564	.0760501	-0.17	0.866	-.1636666	.1379538
_cons	.0006941	.0207754	0.03	0.973	-.0405042	.0418925

H₀: There is no specification error.

Since p-value of _hat sq(hat square) is not significant we fail to reject the null and conclude that our model is correctly specified.

Appendix F: Hypothesis Testing

Appendix F1: Individual test

t est DE

(1) DE = 0

F(1, 100) = 16.97

Pr ob > F = 0.0001

. t est DTA

(1) DTA = 0

F(1, 100) = 77.69

Pr ob > F = 0.0000

. t est OER

(1) OER = 0

F(1, 100) = 0.36

Pr ob > F = 0.5504

. t est PaR

(1) PaR = 0

$$F(1, 100) = 0.67$$

$$\text{Pr ob} > F = 0.4163$$

. test logAsset

(1) logAsset = 0

$$F(1, 100) = 7.65$$

$$\text{Pr ob} > F = 0.0068$$

t est logBor pLOf

(1) logBor pLOf = 0

$$F(1, 100) = 1.35$$

$$\text{Pr ob} > F = 0.2484$$

Appendix F2: Joint test (F-test)

t est de car dt a oer par 30 l ogAsset l cpbor l bor pl of f

To test the null hypothesis that all coefficients do not have any effect on ROE

$$(\beta_{DE}=\beta_{DTA}=\beta_{OER}=\beta_{PaR>30}=\beta_{\log Asset}=\beta_{\log BorpLOff}=0)$$

t est DE DTA OER PaR l ogAsset l ogBor pLOf f

$$(1) DE = 0$$

$$(2) DTA = 0$$

$$(3) OER = 0$$

$$(4) PaR = 0$$

$$(5) l ogAsset = 0$$

$$(6) l ogBor pLOf f = 0$$

$$F(6, 100) = 20.76$$

$$Pr ob > F = 0.0000$$

Since the p-value is 0.0000; we reject the null hypothesis and conclude that the variables jointly have a significant effect on ROE.

DECLARATION

I, G/Michael Zeray, declare that this study entitled “The Determinants of Financial Performance of Microfinance Institutions in Ethiopia: Internal Factor Analysis”, is my own work. I have carried out independently the research work with the guidance and support of the research advisor.

This study has not been submitted to any degree/diploma in this or any other institution. It is done in partial requirement of the MBA Degree in Business Administration.

G/Michael Zeray Kifleyohannes

September 2013

Addis Ababa, Ethiopia

ENDORCEMENT (CERTIFICATION)

This is to certify that G/Michael Zeray has carried out his research work on the topic entitled “The Determinants of Financial Performance of Microfinance Institutions in Ethiopia: Internal Factor Analysis”

This work is original in nature and is suitable for submission for the award of MBA in Business Administration.

Zenegnaw Abiy (Ph.D)

September 2013

Addis Ababa, Ethiopia