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Determinants of Financial Performance of Microfinance Institutions in Ethiopia

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DECLARATION

I declare that this thesis is my original work and that all sources of materials used for this thesis have been fully acknowledged. This thesis has been submitted in partial fulfillment of the requirement for the Degree of Master of Business Administration (MBA) in Finance.

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THESIS APPROVAL

This is to certify that the thesis prepared by Sisay Haile, entitled: ***Determinants of Financial Performance of Microfinance Institutions in Ethiopia: An Empirical Study on Ethiopian Microfinance Institutions*** and submitted in partial fulfillment of the requirements for the Degree of Master of Business Administration in Finance complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

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Abstract

Since MFIs work alongside government organizations and also have ties with larger global organizations they provide a reliable source of financial support and assistance as compared to other sources of financing. In addition, MFIs are considered as one of the policy instruments to eradicate poverty. Therefore, in order to sustain their tremendous contribution to the poorest society in the current dynamic macro-economic environment, they have to periodically research and revisit the major determinants of their performance. Given the above rational, the purpose of this study is to investigate the determinants of performance of MFIs in Ethiopia over a period of twelve years (2003-2015) in the twenty-two selected institutions. The paper employed seven microfinance indicators as independent variables: portfolio at risk (PAR), loan loss reserve ratio (LLR), operating expense ratio (OER), operational self-sufficiency (OSS), financial self-sufficiency (FSS), debt equity ratio (DER) and logarithm of total assets (SIZE) in determining their effect on dependent variable performance of microfinance institutions, return on assets (ROA). Quantitative research approach based on unbalanced panel research design was used. The secondary data were collected from the financial statement which was analyzed by using multiple regression model. The results of the analysis showed that financial self-sufficiency and operational self-sufficiency ratios have positive relationship with explanatory variable return on assets while the remaining independent variables: portfolio at risk, loan loss reserve ratio, operating expense ratio coverage ratio, debt-to-equity ratio and microfinance size, legalism of total asset, have a negative effect on return on assets of MFIs. The analysis also revealed that all the independent variables have significant effect on the performance of sampled MFIs except debt to equity ratio and loan loss ratio ratios. The results further suggested that 46.5% and 55.1% of the variations on the dependent variable were caused by the independent variables in the two models respectively. Based on the above findings, the study recommends that MFI's managements should focus on ensuring the financial and operational sustainability in order to increase their performance. Moreover, they have to give due attention in managing their PAR, OER and company size.

Keywords: *Performance, return on asset,PAR, loan loss reserve, operating expense ratio, operational self-sufficiency, financial self-sufficiency, debt-equity ratio & log of total assets.*

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ACRONYM

ACSI	Amhara Credit and Saving Institution
DECSI	Dedebit Credit and Savings Institution
OCSSCO	Oromia Credit and Savings Share Company
ADSCI	Addis Savings and Credit Institution
OMO	Omo Microfinance Institution Share Company
MoFED	Ministry of Finance and Economic Development
MBB	Micro Banking Bulletin
GDP	Gross Domestic Product
NBE	National Bank of Ethiopia
NGOs	Non-governmental Organizations
GLP	Gross Loan Portfolio
UNCDF	United Nations Capital Development Fund
IMF	International Monetary Fund
MDGs	Millennium Development Goals
SSA	Sub Saharan Africa
SM	Size of Microfinance
FE	Fixed Effects
RE	Random Effects
CLRM	Classical Linier Regression Model
GAAP	Generally Accepted Accounting Principle
DW	Durbin Watson
BJ	Bera-Jarque
OLS	Ordinary Least Square

ROA	Return on Asset
ROE	Return on Equity
PAR	Portfolio at Risk
LLR	Loan Loss Ratio
DER	Debt to Equity Ratio
OER	Operating Expense Ratio
OSS	Operational Self-Sufficiency Ratio
FSS	Financial Self-Sufficiency Ratio
MFIs	Microfinance Institutions

Chapter One

1. Introduction

This chapter deals with the introductory part of the study. It includes: background information, statement of the problem, research hypotheses, objectives, significance, scope, limitation, conceptual framework and organization of the study.

1.1. Background of the Study

Microfinance Institutions (MFIs) are basically related to all financial intermediation services such as savings, credit, funds transfers, insurance, pension and remittances among others by financial institution in both rural and urban areas to low income earners (Robinson, 2001). MFIs help in reducing poverty by providing the poor with sustainable credit facility to start a small business. In many developing countries the formal financial sector serves only five to twenty percent of the population and the number of institutions are very limited (Gallardo et al, 2003). The microfinance sector, apart from being a critical component of the financial system, is also regarded as a poverty reduction strategy for developing countries (kyereboah-coleman, 2007).

The development of microfinance institutions (MFIs) in Ethiopia is a recent phenomenon of 1990s. Following the issuance of proclamation 40/1996, which provides for the establishment of microfinance institutions, various microfinance institutions have legally been registered and started delivering microfinance services (Wolday, 2000). In particular, the Licensing and Supervision of Microfinance Institution Proclamation of the government has encouraged the spread of Microfinance Institutions (MFIs) in both rural and urban areas as it authorizes them, among other things, to legally accept deposits from the general public,

to draw and accept drafts, and to manage funds for the micro financing business (Getaneh, 2005 as cited by Ebisa et al, 2012). However, large numbers of MFIs in Ethiopia are characterized by huge affiliation to the regional governments. For instance: Amhara Credit and Saving Institution (ACSI), Dedebit Credit and Savings Institution (DECSI), Oromia Credit and Savings Share Company (OCSSCO), Addis Savings and Credit Institution (ADSCI) and Omo Microfinance Institution Share Company (OMO), (Gashaw 2014).

Improving the performance of microfinance institutions is a necessary condition to attain their primary objective of eradicating poverty through provision of credit facilities for lower income society (Hollis & Sweetman, 1998). It has been argued that inefficient microfinance institutions will not help the poor in the future because the MFIs will be unable to sustain their operation if they fail to identify their performance determinants and manage effectively (Schreiner, 2000). According to Nyamsogoro (2010), it is better not to have MFIs than having inefficient ones indicating how important the efficiency of microfinance institutions. As many people in East Africa are living below poverty line (World Bank Report 2015), the performance of MFIs is very much critical to the health of the general economy at large.

Although, Ethiopian economy is continuously growing at double digit, as per the report of MoFED 2013, the country is one of the least developed in East Africa. However, the role of microfinance institution in credit provision for rural people is cannot be underestimated. As a result, the interventions of microfinance institutions through the delivery of various financial services are considered as one of the policy instruments of the government to eradicate poverty and bring economic growth to the rural peoples. In order to play their role of poverty alleviation at full capacity, the MFIs have to manage their activities effectively. Given the relationship between the performance of MFIs and their goal of poverty eradication, the

knowledge of the underlying factors that determine the performance of these institutions is essential not only for their managers to improve their performance, but also for numerous stakeholders such as the National Bank, governments, and other financial authorities to continuously monitor and regulate the financial soundness.

Several studies have been conducted on the impact of some variables on the performance of microfinance institutions in various countries as well as in our country. However, the number of variables used to explain the dependent variables are limited. In addition, the levels of significance of the factors that determine the performance of MFIs vary (Melkamu et al, 2012, Abebaw 2014, Letenah 2009). The objective of this study was therefore, to identify the factors that influence the financial performance of microfinance institutions in Ethiopia where the role of those institutions in eradicating poverty and sustaining the economic improvement of poor society is very significants.

1.2. Statement of the problem

MFIs provide financial services to lower income borrowers, who look for relatively small amounts to finance their businesses, manage emergencies, acquire assets, or for smooth consumption (Consultative Group to Assist the Poor, 2003). These borrowers frequently lack credit histories, collateral, or both, and thus, do not have access to financing from mainstream commercial banks. For this reason, MFIs are seen as playing a role in the creation of economic opportunity, and in poverty alleviation. To achieve their prime objective which is alleviating poverty, MFIs should be able to provide financial services efficiently and effectively on a sustainable manner. To be sustainable, MFIs should generate sufficient income to cover their financial costs, costs of administration, and loan loss provisions. A MFIs working towards sustainability on market principle is not different from a formal bank

except for customers that it serves. Hence, they will face a challenges that a formal banking institutions faces in achieving their objectives (Hartungi, 2007).

The establishment of sustainable MFI that reach a large number of rural and urban poor who are not served by the conventional financial institutions, such as the commercial banks, has been a key component of the new development Strategy of Ethiopia (Alemayehu, 2008). Profitability is an appropriate device for achieving long term viability and sustainability of the microfinance industry. At the micro level, profitability is a precondition to a competitive microfinance industry and the cheapest source of capital, without which no firm would attract external capital.

The aforementioned facts give a clue to the Ethiopian microfinance institutions in profits is due to the limited number of microfinance institutions operating in the nation despite large number of clienteles and the underdeveloped nature of the sector (Alemayehu et al. 2008). Therefore, this growth may not continue when the sector becomes highly developed and the competition becomes tough, so investigation of the key determining factors that influence their performance, return on assets, of microfinance institutions is vital. Then, investigation of the major determinants of microfinance institutions performance is essential for all institutions in the sector.

Although, a large body of research on determinants of microfinance institutions performance have been undertaken in Ethiopian conventional banking industry such as (e.g. Belayneh 2011, Birhanu 2012, Habtamu 2012); rigorous empirical evidence on Ethiopian microfinance institutions remains limited due to large number of microfinances and lack of up to date information. Moreover, it is uncommon to undertake a study to identify factors that affect microfinance institutions performance. The studies conducted in the areas of microfinance institutions in Ethiopia are few in number and did not give an emphasis to the factors that

determine their performance. For instance, Letenah (2009) has done research on performance analysis of sample microfinance institutions of Ethiopia using productivity and efficiency ratios, financial viability indicators, profitability indicators, leverage and capital adequacy ratios as well as scale and depth of outreach indicators. However the research did say nothing about determinants of performance of microfinance institutions apart from appraising the performance of Ethiopian MFIs in terms of various criteria by comparing with the Micro banking Bulletin (MBB) benchmark.

The study by Melkamu (2012) and Abebaw (2014) have also tried to see the factors affecting financial and operational sustainability of Ethiopian MFIs. However, the researchers used a limited number of variables such as gross loan portfolio, personnel productivity ratio, cost per borrower, liquidity ratio, number of active borrowers, operating expense ratio, portfolio quality, gearing ratio, real GDP and market concentration. Therefore, it seems essential to study determinants of profitability of MFIs by increasing the number of variables based on the previous studies as well as the number of microfinance institutions in order to enhance the validity and generalizability of the study.

1.3. Objective of the Study

1.3.1. General Objective of the Study

The main objective of this study was to investigate the determinants of performance of microfinance institutions in Ethiopia.

1.3.2. Specific Objectives of the Study

Specifically, this study addressed the following objectives;

1. To examine the significance of financial self-sufficiency ratio on the financial performance, return on asset, of Microfinance Institutions in Ethiopian.

2. To determine the impact of operational self-sufficiency ratio on financial performance, return on asset, of Microfinance institutions in Ethiopia.
3. To investigate how capital structure/ debt to equity ratio influence the financial performance of Microfinance Institutions in Ethiopia.
4. To determine the impact of portfolio at risk on the financial performance, return on asset, of Microfinance Institutions in Ethiopian.
5. To discover the effect of loan loss ratio on the financial performance, return on asset of Microfinance Institutions in Ethiopia.
6. To explore the impact of operating expense ratio, managerial efficiency, on the financial performance, return on asset, of Microfinance Institutions in Ethiopian.
7. To probe the effect of Microfinance Institution size on the performance, return on assets of MFIs.

1.4. Research Hypothesis

Although many quantitative studies use research questions a more formal statement of research employs research hypotheses. These research hypotheses are predictions about the outcome of the results or a statement created by the study to speculate the outcome of a research. They may be written as alternative hypotheses specifying the exact results to be expected (more or less, higher or lower of something). They can also be stated in the null form, indicating no expected difference or no relationship between groups on a dependent variable as stated by (Creswell 2009).

Therefore, the study were developed the following hypotheses:

Hypotheses 1: There is a positive significant causal effect between financial self-sufficiency ratio and return on asset of MFIs.

Hypotheses 2: Operational self-sufficiency ratio has significant positive effect on return on assets of MFIs.

Hypotheses 3: Capital structure/ debt to equity ratio have a positive significant effect on return on asset of MFIs.

Hypotheses 4: Portfolio quality has a positive significant effect on return on asset of MFIs.

Hypotheses 5: There is a negative significant effect between loan loss ratio and performance, return on asset of MFIs.

Hypotheses 6: Managerial efficiency, operating expense ratio, has a positive significant effect on return on asset of MFIs.

Hypotheses 7: There is a negative significant causal effect between MFIs size and their performance, return on asset of MFIs.

1.5. Significance of the Study

As mentioned above, the main objective of the study was to investigate the determinants of financial performance of microfinance institutions in Ethiopia.Therfore,the findings of the study are expected to be significant in that they:

- Will also initiate microfinance institutions to give due emphasis on the management of identified variables.
- Will provide microfinance institution's managers with understandings of activities that would enhance their performance.
- Will help the decision makers such as NBE, clients, etc to watch out the determining factors of MFIs performance and give due focus for the factors in all aspects of their decision making.
- Will also provide a guide for further studies in the area.

1.6. Scope and Limitation of the Study

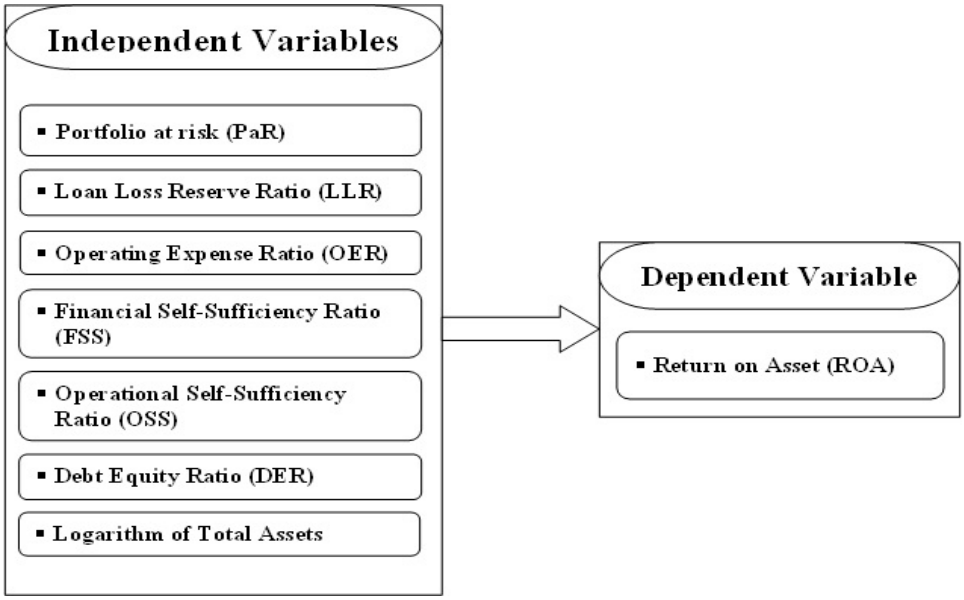
This study was confined only to the identification of the key determinants of financial performance of the selected twenty-two Microfinance Institutions in Ethiopian by analyzing the financial statements make it from 2003 to 2015 fiscal year. The study used a thirteen years data in order to fit in the regression model. This was because, as per Akaike Information Criterion, increasing the number of sample size will always improve the goodness of the fit,(Efrem 2014). The study comprised all Microfinance Institutions which started their operation before 2003. In addition, the study focused on the microfinance institutions whose data were available for at least five years out of the required thirteen years data. Therefore, microfinance institutions whose data for at least five years were not available from the required thirteen years were not considered. Secondly, since the study was purely quantitative it used the quantitative measures of performance. As a result it disregarded the qualitative aspect. However, since the research considered large scale observation the above mentioned limitations would not compromise the quality of the research.

1.7. Conceptual Framework

The research considered seven explanatory variables namely, portfolio at risk, loan loss reserve ratio, operating expense ratio, operational self-sufficiency, financial self-sufficiency, debt equity ratio and logarithm of total assets, to see their significance level on microfinance institutions performance, return on equity of microfinance institutions in Ethiopia. These variables were prepared on the basis of major performance indicators of MFIs which are stated by Ledgerwood (1999).

The conceptual framework of the research, which describes the relationship of explanatory and explained variables, is presented in the following diagram.

Figure 1: The relationship between explained and explanatory variables



Source: self-constructed

1.8. Organization of the Paper

The paper is organized into five (5) chapters. The first chapter deals with the introduction of the study, which includes background of the study, statement of the problem, research question, general and specific objectives, significance, scope as well as limitations of the study. The second chapter presents review of theoretical and empirical literatures conducted so far on the study area. The third chapter, on the other hand, provides a framework (methodology) used to conduct the study. This includes sample and sampling techniques,

method of data collection and analysis. Data analysis and presentation are presented on the fourth chapter. The last chapter presents conclusions and recommendations.

Chapter Two

In order to put the study within the context of the existing literature, the subsequent section of this chapter present the review of both theoretical and empirical studies related to the determinants of financial performance of MFIs.

2. Review of Related Literatures

In order to provide readers with deeper understanding of the paper, the theoretical framework that involves relevant theories and the previous research studies conducted so far in the area of determinants of performance of microfinance institutions are discussed in this chapter.

2.1. Theoretical Literatures

2.1.1. Definition of Microfinance

Although the definitions of microfinance institutions given by various authors and organizations seems to be different from one another, in essence they are the same. The term microfinance refers to the provision of financial services primarily savings and credit to the poor and low income households that don't have access to commercial banks (Arsyad, 2005).

Microfinance, according to Otero (1999) is "the provision of financial services to low-income poor and very poor self-employed people". These financial services, according to Ledgerwood (1999), generally include savings and credit but can also include other financial services such as insurance and payment services. Schreiner and Colombet (2001) define microfinance as "the attempt to improve access to small deposits and small loans for poor households neglected by banks." Therefore, microfinance is understood in this study as involveing the provision of financial services such as savings, loans and insurance to poor

people living in both urban and rural settings who are unable to obtain such services from the formal financial sector.

2.1.2. History of Microfinance

Over the past centuries, practical visionaries, from the Franciscan monks who founded the community- oriented pawnshops of the 15th century to the founders of the European credit union movement in the 19th century (Friedrich Wilhelm Raiffeisen) and the founders of the microcredit movement in the 1970s (Muhammad Yunus and Al Whittaker), have tested practices and built institutions designed to bring the kinds of opportunities and risk-management tools that financial services can provide to the doorsteps of poor people. Although, the success of the Grameen Bank has inspired the world, it has proved difficult to replicate this success (Kannan 2013). In nations with lower population densities, meeting the operating costs of a retail branch by serving nearby customers has proven considerably more challenging.

The history of micro-financing can be traced back as far as the middle of the 1800s, when the theorist Lysander Spooner was writing about the benefits of small credits to entrepreneurs and farmers as a way of getting the people out of poverty (Kannan and Panneerselvam 2013). Independently of Spooner, Friedrich Wilhelm Raiffeisen founded the first cooperative lending banks to support farmers in rural Germany. The modern use of the expression "micro-financing" has roots in the 1970s when organizations, such as Grameen Bank of Bangladesh with the microfinance pioneer Muhammad Yunus, were starting and shaping the modern industry of micro-financing.

Professor Muhammad Yunus who was the Nobel Prize winner in 2006, disbursed first loans from his own pocket to a group of rural women in Jobra in 1976 and successfully developed the concept of microfinance with his Grameen Bank throughout the country and later the whole world (Ledgerwood, 1999).The Grameen bank, which is now serves more than 2.4 million clients (94 % of them women) and is a model for many countries (Ledgerwood, 1999). Other examples of early pioneers besides Grameen Bank are ACCION International in Latin America, Self-employed Women‟s Association Bank in India and many more (Helms, 2006). Beginning in the mid-1980s, the subsidized, targeted credit model supported by many donors was the object of steady criticism, because most programs accumulated large loan losses and required frequent recapitalization to continue operating. It became more and more evident that market-based solutions were required. This led to a new approach that considered microfinance as an integral part of the overall financial system.

In the early 1990s the term “microcredit” was replaced by “microfinance” which included not only credits but also other financial services for poor people (Elia, M. 2006). The introduction of the term microfinance followed the success of many microcredit programs around the world and in 1997, during the first Microcredit Summit, 2,900 delegates from 137 countries representing around 1,500 organizations gathered in Washington, D.C. During that occasion, the birth of the global industry of microfinance was officially recognized. Since then the focus started to change and the provision of credit was considered to be important, to the need of becoming financially sustainable through the provision of a complete range of financial products and to reach more people.

2.1.3. History of Microfinance in Ethiopia

Following the 1984/85 severe drought and famine, many NGOs started to offer micro credit along with their relief activities although this was on a limited scale and not in a sustained manner (Alemayehu, 2008). However, the micro-credit sector in Ethiopia has been strictly regulated since 1996. Following an assessment of revolving funds managed in the framework of NGO development projects, a piece of law was promulgated with the aim of professionalizing the sector by reducing imprudent lending practices, lenient financial discipline and distortions due to unrealistic interest rates (Melkamu, 2012). Formal micro-finance in Ethiopia started in 1994/5. In particular, the Licensing and Supervision of Microfinance Institution Proclamation of the government during 1996 encouraged the spread of Microfinance Institutions in both rural and urban areas as it authorized them among other things, to legally accept deposits from the general public, to draw and accept drafts, and to manage funds for the micro financing business.

Following the commencement of formal micro-finance service in Ethiopia in 1994/5, the Licensing and Supervision of Microfinance Institution Proclamation of the government during 1996 encouraged the spread of Microfinance Institutions in both rural and urban areas as it authorized them among other things, to legally accept deposits from the general public (hence diversify sources of funds), to draw and accept drafts, and to manage funds for the micro financing business.

Although the development of microfinance institutions in Ethiopia started very recently, the industry has shown a remarkable growth in terms of outreach particularly in number of clients. Since the issuance of Proclamation 40/1996, which provides the establishment of microfinance institutions, thirty six microfinance institutions (MFIs) have been legally

registered by the National Bank of Ethiopia (NBE) and started delivering services (Sileshi 2015).

When we look at the performance of microfinance's, despite the large expansion of the industry, the Ethiopian MFIs in general are poor performers on depth of outreach (Letenah 2009). They are not reaching the poorest of the poor. They are also poor in terms of the ratio of GLP to assets, allocating a lower proportion of their total assets in to loans and they are not using their debt capacity properly. On the contrary, the majority of MFIs are good at breath of outreach, cost management, efficiency and productivity.

2.1.4. Microfinance and Its Impact on Development

Microfinance has a very important role to play in development according to proponents of microfinance. UNCDF (2004) states various studies have shown that microfinance institutions play three key roles in development.

- They help very poor households meet basic needs and protects against risks,
- They are associated with improvements in household economic welfare,
- They help to empower women by supporting women's economic participation and thereby promote gender equity.

Otero (1999) illustrates the various ways in which "microfinance, at its core combats poverty". She states that microfinance creates access to productive capital for the poor, which together with human capital, addressed through education and training, and social capital, achieved through local organization building, enables people to move out of poverty (1999). By providing material capital to a poor person, their sense of dignity is strengthened and this can help to empower the person to participate in the economy and society (Otero, 1999).

The aim of microfinance according to Otero (1999) is not just about providing capital to the poor to combat poverty on an individual level, it also has a role at an institutional level. It seeks to create institutions that deliver financial services to the poor, who are continuously ignored by the formal banking sector. Littlefield and Rosenberg (2004), state that the poor are generally excluded from the financial services sector of the economy and therefore MFIs have emerged to address this market failure. By addressing this gap in the market in a financially sustainable manner, MFI can become part of the formal financial system and so can access capital markets to fund their lending portfolios, allowing them to dramatically increase the number of poor people they can reach (Otero, 1999).

More recently, commentators such as Littlefield, Murduch and Hashemi (2003), Simanowitz and Brody (2004) and the IMF (2005) have commented on the critical role of microfinance in achieving the Millennium Development Goals (MDGs). Simanowitz and Brody (2004) state, "Microfinance is a key strategy in reaching the MDGs and in building global financial systems that meet the needs of the more poor people." Littlefield, Murduch and Hashemi (2003) state "microfinance is a critical contextual factor with strong impact on the achievements of the MDGs…microfinance is unique among development interventions: it can deliver social benefits on an ongoing, permanent basis and on a large scale". Various case studies have also show how microfinance has played a role in eradicating poverty, promoting education, improving health and empowering women (2003).

However, not all commentators are as enthusiastic about the role of microfinance in development and it is important to realize that microfinance is not a silver bullet when it comes to fighting poverty. Hulme and Mosley (1996), while acknowledging the role microfinance can have in helping to reduce poverty, concluded from their research on

microfinance that "most contemporary schemes are less effective than they might be" (1996). They state that microfinance is not a panacea for poverty-alleviation and that in some cases the poorest people have been made worse-off by microfinance. Rogaly (1996) finds five major faults with MFIs. He argues that:

- They encourage a single-sector approach to the allocation of resources to fight poverty,
- Microcredit is irrelevant to the poorest people,
- An over-simplistic notion of poverty is used,
- There is an over-emphasis on scale,
- There is inadequate learning and change taking place.

Wright (2000), states that much of the scepticism of MFIs stems from the argument that microfinance projects "fail to reach the poorest, generally have a limited effect on income…drive women into greater dependence on their husbands and fail to provide additional services desperately needed by the poor". In addition, Wright says that many development practitioners not only find microfinance inadequate, but that it actually diverts funding from "more pressing or important interventions" such as health and education (2000). As argued by Navajas et al (2000), there is a danger that microfinance may siphon funds from other projects that might help the poor more. They state that governments and donors should know whether the poor gain more from microfinance, than from more health care or food aid for example. Therefore, there is a need for all involved in microfinance and development to ascertain what exactly has been the impact of microfinance in combating poverty.

Considerable debate remains about the effectiveness of microfinance as a tool for directly reducing poverty, and about the characteristics of the people it benefits (Chowdhury, Mosley and Simanowitz, 2004). Sinha (1998) argues that it is notoriously difficult to measure the impact of microfinance programs on poverty. This is so she argues, because money is fungible and therefore it is difficult to isolate credit impact, but also because the definition of 'poverty', how it is measured and who constitute the 'poor' "are fiercely contested issues" (1998).

Poverty is a complex issue and is difficult to define, as there are various dimensions to poverty. For some, such as World Bank, poverty relates to income, and poverty measures are based on the percentage of people living below a fixed amount of money, such as US$1 dollar a day (World Bank, 2003).

2.1.5. The Impact of Microfinance on Poverty

There is a certain amount of debate about whether impact assessment of microfinance projects is necessary or not according to Simanowitz (2001). The argument is that if the market can provide adequate proxies for impact, showing that clients are happy to pay for a service, assessments are a waste of resources. However, this is too simplistic a rationale as market proxies mask the range of client responses and benefits to the MFI. Therefore, impact assessment of microfinance interventions is necessary, not just to demonstrate to donors that their interventions are having a positive impact, but to allow for learning within MFIs so that they can improve their services and the impact of their projects (Simanowitz, 2001) as quoted by Eoin Wrenn (2005).

Poverty is more than just a lack of income. Wright (1999) highlights the shortcomings of focusing solely on increased income as a measure of the impact of microfinance on poverty. He states that there is significant difference between increasing income and reducing poverty (1999). He argues that by increasing the income of the poor, MFIs are not necessarily reducing poverty. It depends on what the poor do with this money, oftentimes it is gambled away or spent on alcohol (1999), so focusing solely on increasing incomes is not enough. The focus needs to be on helping the poor to "sustain a specified level of well-being" (Wright, 1999) by offering them a variety of financial services tailored to their needs so that their net wealth and income security can be improved.

It is commonly asserted that MFIs are not reaching the poorest in society. However, despite some commentators' skepticism of the impact of microfinance on poverty, studies have shown that microfinance has been successful in many situations. According to Littlefield, Murduch and Hashemi (2003) "various studies…document increases in income and assets, and decreases in vulnerability of microfinance clients". They refer to projects in India, Indonesia, Zimbabwe, Bangladesh and Uganda which all shows very positive impacts of microfinance in reducing poverty. For instance, a report on a SHARE project in India showed that three-quarters of clients saw "significant improvements in their economic well-being and that half of the clients graduated out of poverty" (2003).

Dichter (1999), states that microfinance is a tool for poverty reduction and while arguing that the record of MFIs in microfinance is "generally well below expectation" he does concede that some positive impacts do take place. From a study of a number of MFIs he states that findings show that consumption smoothing effects, signs of redistribution of wealth and influence within the household are the most common impact of MFI programs.

Hulme and Mosley (1996) in a comprehensive study on the use of microfinance to combat poverty, argue that well-designed programs can improve the incomes of the poor and can move them out of poverty. They state that "there is clear evidence that the impact of a loan on a borrower's income is related to the level of income" as those with higher incomes have a greater range of investment opportunities and so credit schemes are more likely to benefit the "middle and upper poor" (1996). However, they also show that when MFIs such as the Grameen Bank and BRAC provided credit to very poor households, those households were able to raise their incomes and their assets.

Mayoux (2001) states that while microfinance has much potential the main effects on poverty have been:

- Credit making a significant contribution to increasing incomes of the better-off poor, including women,
- Microfinance services contributing to the smoothing out of peaks and troughs in income and expenditure thereby enabling the poor to cope with unpredictable shocks and emergencies.

Hulme and Mosley (1996) show that when loans are associated with an increase in assets, when borrowers are encouraged to invest in low-risk income generating activities and when the very poor are encouraged to save; the vulnerability of the very poor is reduced and their poverty situation improves.

Johnson and Rogaly (1997) also refer to examples whereby savings and credit schemes were able to meet the needs of the very poor. They state that microfinance specialists are beginning to view improvements in economic security, rather than income promotion, as the first step in poverty reduction as this reduces beneficiaries' overall vulnerability.

Although much debate remains about the impact of microfinance projects on poverty, we have seen that when MFIs understand the needs of the poor and try to meet these needs, projects can have a positive impact on reducing the vulnerability, not just of the poor, but also of the poorest in society Eoin Wrenn (2005).

2.1.6. Performance Measurement in Microfinance Institutions

Performance of an institution shall be measured from the objectives of the organization angel. Microfinance's goal is to eradicate poverty. In the early days when MFI started they were financed by donor funds that have a poverty eradication goal. Therefore, the performance of the MFI was measured on how much MFI reach to the poor (outreach) and how the lives of those who get financial services are changing as compared to those who don't get these services (impact). However, as the microfinance industry grew in size, the need for increased financing coupled with unpredictability of donor funds trigger the issue of building a sustainable MFIs that stand on their own leg that is MFIs shall start covering their own cost of operation from their program revenues as quoted by Letenah (2009).

The different perspective on which the microfinance performance is to be measured has created two opposing but having the same goals school of thought about the microfinance industry. These are called the welfarists and the institutionalist. Although, they share the goal of poverty reduction, these two approaches put microfinance in the crossroads Brice Gaetan (2012).

The Welfarists are based on the theory of social responsibility vis-a-vis the customer to meet its expectations (Carroll, 1979; Servet, 2007). This school of thought evaluates the performance of microfinance institutions in terms of the customer through the social

(outreach) and impact analysis (impact assessment). Welfarists argue that microfinance institutions can achieve sustainability without achieving financial sustainability. They contend that donations serve as a form of equity and as such donors can be viewed as social investors. Unlike private investors who purchase equity in publicly traded firm, social investors don't expect to earn monetary returns. Instead these donor investors realize a social (intrinsic) return. (Basu and Woller, 2004).

Welfarists tend to emphasize poverty alleviation, place relatively greater weight on depth of outreach relative to breadth of outreach and gauge institutional success according to social metrics. They feel these issues are important, but they are less willing than institutionist sacrifices depth of outreach to achieve them (Basu and Woller, 2004). On the contrary, institutionalists argue that, unless we build sustainable microfinance institutions that are capable of running independent of subsidies the promise of microfinance institutions in eradicating world poverty will not be met. They argue that sustainable MFI helps to expand outreach and reach more poor people.

The main difference of the two schools of thought is on the way or methodology of eradicating poverty. Welfarists say we have to target the very poor and profitability shall be secondary. They prefer to charge subsidized and low interest rates by relying on donor funds. Institutionalist on the other hand argues donor funds are unreliable and MFI by themselves must generate enough revenues to reach more poor people in the future. They favor marginally poor customer. They charge higher interest rates and focus on efficiency of MFIs to generate profit and reach more poor.

For many years the MFI industry was operating with subsidy from donors and governments but there is now a pressure on these organizations to be financial sustainable. However, it

seems that serving the poor and being financially self-sufficient seems contradictory. Various arguments are forwarded: the poor can't pay high interest rate, if the poor consume it has no collateral, there is big transaction cost in serving the poor. But these assumptions are falsified in the last 20 years and the poor is seen as capable of paying high interest as ROI of small projects are larger than large projects, the poor don't consume the money, the money is rather use for financing his/her business, transaction cost barriers are mitigated by the creation of group lending, absence of physical collateral is mitigated by social capital. Hence contrary to the expectations the MFI industry has shown significant repayment rate although high repayment rates can't be translated into financial sustainability.

However there seem many unresolved problems. Many MFI can't reach a significant portion of the world poor; they can't be free from subsidies. Mixed results are read on the impact of the micro credit on lives of the poor. Can we serve the poor but still financially self-sufficient? Is the MFI model correct? If so what are hindering them to achieve the targets set? What optimal solution is available for the MFI in reaching the poor and being financially self-sufficient?

The performance of microfinance institutions could be measured in different parameters. Consulting different literature, the following are usually measure used.

I. Profitability Indicator

Profitability measures, such as return on equity and return on assets, tend to summarize performance in all areas of the company (Inter-American Development Bank, 2003). If portfolio quality is poor or efficiency is low, this will be reflected in profitability. Because they are an aggregate of so many factors, profitability indicators can be difficult to interpret. These indicators measure the MFI net income in relation to the structure of its balance sheet.

However, the study has decided to use ROA as a measure of profitability rather than ROE. Because, as it is indicated by Inter-American Development Bank Sustainable Development Department, 2003, ROE is particularly relevant for private for-profit entity with real flesh-and-blood owners. For them, ROE is a measure of paramount importance since it measures the return on their investment in the institution. However, given that the primary objective of many MFIs is not a profit making, the ROE indicator is most often used as a proxy for commercial viability. As a result, ROA will be used as explained variable for the regression model.

a) Return on Assets

Return on Assets (ROA) Ratio is a percentage (%), which measures the net income earned on the assets of a Microfinance Institution (MFI). It can be calculated using the formula: ROA = Net Income (Excluding Donation)/Average Asset. This ratio is an overall measure of profitability that reflects both the profit margin and the efficiency of the institution. It tells how effectively a management generates earnings from its investments. Return on assets is a fairly straightforward measure. However, as in the case of ROE, a correct assessment of ROA depends on the analysis of the components that determine net income, primarily portfolio yield, cost of funds and operational efficiency.

For calculating ROA ratio, average total assets are used, rather than performing assets. This is because, the entire organization is being measured on its total financial performance, including decisions made to purchase fixed assets or invest in land and buildings (in other words, using funds that could be used for other revenue-generating investments), or invest in securities. It is simply calculated by dividing net income (after taxes and excluding any grants or donations) by period average assets.

II. Portfolio Quality Indicators:

Portfolio quality is a crucial area of analysis, since the largest source of risk for any financial institution resides in its loan portfolio. The loan portfolio is by far an MFI's largest asset and, in addition, the quality of that asset and therefore, the risk it poses for the institution can be quite difficult to measure. For microfinance institutions, whose loans are typically not backed by bankable collateral, the quality of the portfolio is absolutely crucial. Fortunately, many microfinance institutions have learned how to maintain loan portfolios of very high quality. In fact, leading microfinance institutions typically better at maintaining a higher portfolio quality than their commercial bank peers in many countries Inter-American Development Bank (IADB, 2003).

This ratio provides information on the percentage of non-earning assets, which in turn decrease the revenue and liquidity position of MFIs. As a result, among the measures of portfolio quality the study has randomly selected to use repayment rates, portfolio at risk and loan loss reserve ratio for the regression.

a) Portfolio at Risk

Portfolio at risk is a percentage (%), which represents the proportion of MFI's total gross outstanding loan portfolio that is at default risk. It can be calculated using the formula: PaR= (Portfolio past due>90 +rescheduled portfolio)/gross loan portfolio. This ratio 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 the loan will be repaid. Generally speaking, any portfolio at risk (PaR90) exceeding 10% should be cause for concern, because unlike commercial loans, most micro credits are not backed by bankable collateral.

The portfolio at risk measure is free from much of the subjective interpretations that plague other portfolio quality indicators, such as repayment rate. Furthermore, portfolio at risk is a more conservative measure of the institutional risk than repayment rate or arrears because both the numerator and the denominator include the outstanding balance it measures the complete risk and not only the immediate threat.

Portfolio at Risk (PaR) is calculated by dividing the outstanding balance of all loans with arrears over 90 days, plus all refinanced (restructured) loans, by the outstanding gross portfolio as of a certain date. Since the ratio is often used to measure loans affected by arrears of more than 60, 90, 120 and 180 days, the number of days must be clearly stated (for example PaR90).

Not all MFIs are able to separate their restructured loans from their non-restructured loans. Consequently, if restructured loans do not appear to be material (less than 1%), then the total portfolio affected by arrears greater than 90 days can be accepted as a proxy of the portfolio at risk. Even if restructuring appears to be significant (but cannot be precisely determined) the portfolio at risk ratio can still be presented, but should then specify that it does not include restructured loans. Simply ignoring restructured loans would underestimate risk significantly.

b) Loan Loss Reserve Ratio (LLR)

The LLR Ratio is a percentage (%) that reflects accumulated provision expenses (minus write-offs), and gives an indication of management's expectation of future loan losses. It can be calculated using the formula: LLR = Total Loan Loss Reserve Amount to Total Gross Outstanding Loan Portfolio (Sum of Principal Outstanding of All Loans). Generally speaking, it is a rough indicator of the overall quality of the portfolio and it represents the

"loan loss reserve amounts maintained by Microfinance Institution (MFI) to offset the default risk in its total (outstanding) loan portfolio".

It can be calculated by dividing Total Loan Loss Reserve Amount to Total Gross Outstanding Loan Portfolio (Sum of Principal Outstanding of All Loans)

III. Efficiency Indicators:

Efficiency indicators are performance measures that show how well the institution is streamlining its operations. Efficiency indicators take into account the cost of the inputs and/or the price of outputs. Since these indicators are not easily manipulated by management decisions, they are more readily comparable across institutions than, say, profitability indicators such as return on equity and assets. Efficiency measures are less comprehensive indicators of performance than those of profitability.

Efficiency ratios provide information about the rate at which the MFI generate revenue to cover their expense. It refers to the cost per unit of output. Common efficiency ratios used in various previous researches includes operating cost ratio as well as salaries and benefits to average portfolio outstanding will be used as efficiency ratio for the regression model.

a) Operating Expense Ratio

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 will be.

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.

IV. Financial Viability Indicators:

Financial viability refers to the ability of the MFI to cover its costs with earned revenue. A financially viable MFI will not rely on donor funding to subsidize its operation. The most commonly used indicators of financial viability, Operational Self Sustainability (OSS) and Financial Self Sustainability (FSS), will be used.

a) Operational Self Sustainability (OSS)

Operating self-sufficiency is a percentage (%), which indicates whether or not enough revenue has been earned to cover the Microfinance Institution's (MFI's) total costs – operational expenses, loan loss provisions and financial costs. The formula used to calculate OSS: Operating income (Loans + Investment) / Operating Cost + Loan Loss Provisions + Financing Cost Standard.

b) Financial Self Sustainability (FSS)

Financial Self-Sufficiency is an important measure of sustainability of the lending operations. Looking at this Ratio as a self-sufficiency figure allows determination of the extent to which operations are becoming (increasingly) self-sustaining.

It can be calculated by dividing Operating Income (Loans + Investments) to Operating Costs + Loan Loss Provisions + Financing Costs + Adjusted Cost of Capital

V. Capital Structure Indicator:

Leverage refers to the extent to which a MFI borrows money relative to its amount of equity. In other words, it answers the question of how many additional dollars can be mobilized from

commercial sources for every dollar worth of funds owned by the MFI. The most widely used measure of leverage is the debt equity ratio. Capital adequacy refers to the amount of capital a MFI have relative to its assets. Capital adequacy means there is a sufficient level of capital required to absorb potential losses while providing financial sustainability. The measure used for capital adequacy is the ratio of capital to risk weighted assets.

a) Debt Equity Ratio

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. 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. Even the most highly leveraged MFIs still carry less debt than conventional banks because microloan portfolios are backed by less collateral and their risk profiles are still not as well understood as those of conventional banks.

The Debt/Equity Ratio is calculated by dividing total liabilities by 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.

VI. Microfinance Size

Total assets of the microfinance institutions measure MFI's size. In The size of the MFIs will be used as an independent variable, which account for size related economies and diseconomies of scale. In most of the finance literature, the total assets of the MFI are used as a proxy for MFI size. However, since total assets deflated the dependent variable in the model it would be appropriate to take natural logarithm before including it in the model to be consistent with other ratios. Size is used to capture the fact that larger MFI are better placed than smaller MFI in harnessing economies of scale in transactions to the plain effect that they will tend to enjoy a higher level of profits.

2.2. Empirical Literature

2.2.1. International Studies

Trong (2012) has conducted a research on Capital Structure and Microfinance Performance. The major objective was to provide in-depth analysis and to introduce possible explanations for the relationships between funding, scale of operation and microfinance performance. In order to attain this objective, the study has used financial leverage and scale of operation as dependent variable to see their impact on Vietnam's microfinance performance (efficiency, sustainability and depth and breadth of outreach). Accordingly, the research has revealed that the link between funding and microfinance performance varies with the heterogeneity of microfinance institutions' characteristics. Profitable and regulated microfinance institutions have higher sustainability, efficiency and outreach. In addition, a large scale of operation helps microfinance institutions achieve higher efficiency, profitability, sustainability and outreach (breadth and depth). Fourth, there is no trade-off between the breadth of outreach

and efficiency. Moreover, larger loan sizes are associated with higher loan costs and the global financial crisis has had a minor impact on the performance of microfinance institutions since they have a low level of self-sufficiency, associated with a low degree of financial integration.

Jordan (2008) studied the impact of macroeconomic environment on sustainability of Latin American MFIs by selecting 85 MFI. The major objective of the study was to investigate the impact of macroeconomic factors (external) on sustainability of selected MFIs in Latin America. The study considered four macro-economic factors; unemployment rate, per capita GDP, interest rates and inflation as explanatory variables and ROE and repayment rates as a measure of sustainability of the MFIs, dependent variable. The result shows that, none of the macro economic factors have significant impact on repayment rate. However, ROE is highly influenced by per capita GDP. To see the effect of per capita GDP, two divisions were set; one is low income developing nations and the other is high income developing nations. In this regard per capita GDP has no impact on low income developing nations but, there is a high significant impact of per capita GDP on high income nations.

Dissanayake (2012) has also tried to investigate the determinants of profitability of MFIs in Sri-Lanka. The major objective was to see the relationship between different internal (MFI specific factors) and return on equity. For the study, debt to equity ratio, operating expense ratio, write-off ratio, cost per borrower ratio and personal productivity ratio as explanatory variables and ROA as explained variable have been used. The finding shows that, debt to equity ratio and operating expense ratios have negative statistical significance relation with ROE. On the other hand, write-off ratio and cost per borrower ratios have a positive and

statistically significant relationship with ROE. However, personnel productivity ratio is not statistically significant determinant of ROE.

Gibson, (2012) has also conducted a research titled "Determinants of Operational Sustainability of Micro Finance Institutions" in Kenya. The major objective of the research was to find out the factors that affect the operations self- sufficiency and financial sustainability. In addition it was intended to propose a more comprehensive and representative model for financial sustainability by creating an index to observe the financial performance of microfinance sector. In so doing, the study utilized a descriptive research design and targeted 30 microfinance institutions (MFIs) to collect the required data and analyzed using multiple regression model. Capital/ asset ratio and Operating Expenses/Loan Portfolio indicators as independent variable and Operational Self Sufficiency retio as dependent variable were used in the regression model. Accordingly, the research revealed that the factors that affect the operations and financial sustainability are capital/ asset ratio and operating expenses/loan portfolio. The study also suggested the inclusion of these indictors along with operational self -sufficiency to create sustainability index.

Menzie (2011) conducted a research with the title of "The effect of subsidies on the performance and sustainability of microfinance institutions" in sub Saharan Africa. The major objective was to bridge the information gap on the performance of microfinance institutions in Sub Saharan Africa (SSA). A quantitative research approach was used in the analysis of financial data collected from 92 selected MFIs and estimated using panel data estimation. Dependent Index (SDI), Return on Asset (ROA), Operational Self-Sufficiency (OSS) and Financial Self-Sufficiency (FSS) indicators were used for the analysis. Accordingly, the summary results of the analysis showed that the majority of MFIs (90.22%)

were not sustainable nor were they found to be profitable. However, the results show that all the institutions were operationally self-sufficient and that on average MFIs in SSA charged higher interest rates than MFIs in other parts of the world. The average OSS was 136.01% showing that MFIs are operationally self-sufficient, however the average FSS value was 74.32% reflecting that the MFIs are not able to raise enough revenue to cover their capital and indirect costs which would ultimately result in them running out of equity funds.

A research conducted by Sara Ek (2011) on "The implications of financial sustainability" in the microfinance industry was aimed to map the key characteristics of financially sustainable microfinance institutions (MFIs) and what features that separates them from their non-sustainable counterparts. For the analysis variables like financial sustainability, financial sustainability, profit status, efficiency, outreach, deposits, loan losses, interest rates and transparency were used. Accordingly, the study revealed that for-profit MFIs are self-sufficient to a greater extent than the non-sufficient ones, which might be caused by the pressure to deliver value to shareholders. Furthermore, there are indications that self-sufficient MFIs are more efficient, which can be assumed to be caused by technological advantages, or different lending methods. The findings on outreach are somewhat contradictory; sustainable MFIs are reaching more clients on average, which discards a mission drift. On the other hand, self-sufficient MFIs have larger average loan sizes and less female borrowers, two indications that a mission drifts actual exist. Self-sufficient MFIs have also proven to have lower loan loss rates and lower yields on loan portfolio. Positive findings, as they indicate that the MFIs have sound loan portfolios and that they have managed to become self-sustainable not by exploiting the poor, but by reducing costs and increasing efficiency.

NdiGwasi, (2014) conducted a research titled "Competition and Performance of Microfinance Institutions" in Cameroon. The main objectives of this study were to determine the impact of competition on the performance of MFIs in Cameroon and to identify the principal determinants of performance for MFIs. The study used a multiple regression model to relate financial performance (ROA) to various explanatory variables such as operational expenses ratios, portfolio at risk, staff productivity, savings mobilization and industry competition. Accordingly, in contrary to most empirical works on competition in the microfinance industry which prone a negative effect of competition on the performance of MFIs, the findings from this study reveal a positive coefficient, implying that competition rather have a positive effect on financial performance. That coefficient however, turns out to be statistically insignificant. There is also evidence that operational expense ratio, portfolio at risk and staff productivity ratios were major determinants of performance for microfinance institutions.

Zohra (2011) have done a research on comparison of performance of microfinance institutions with commercial banks in India. The major objective of the research was to study and compare the financial performance of Indian microfinance institutions and commercial banks in India. In so doing, the study have used variables such as capital adequacy ratio, debt equity ratio, return on asset; return on equity, net profit margin and operating expenses to assets ratio for the analysis. Accordingly, the research have revealed that there is a significant difference in the means of the capital adequacy ratio and operating expenses to total assets ratio of commercial banks and microfinance institutions at 5% level of significance. On the other hand, the output of the research shows that there is no significant difference between

the means of debt equity ratio, return on asset, return on equity and net profit margin of commercial banks and microfinance institutions at 5% level of significance.

Lawrence (2012) has also tried to find out the factors influencing the sustainability of Micro-Finance Institutions in Murang'a Municipality. The main objective the study was to identify whether financial regulations, geographical coverage and reach of the microfinance institutions in Morang's municipality influence their sustainability. The study used financial regulations, geographical coverage and reach as explanatory variables to see their effect on explained variable, sustainability of microfinance institutions. Accordingly, the study found that financial regulations, number of clients served, financial coverage and volume of credit transacted were the factors that highly affected the sustainability of microfinance institutions. As a result, the study concluded that sustainability of MFIs is a function of related and interconnected factors. Finally, it the study recommended microfinance institutions to open many branches to reach as many people as possible and ensure they conform to rules and regulations.

2.2.2. Local Studies

Letenah (2009) has conducted a research titled Performance analysis of sample microfinance institutions of Ethiopia. The major purpose of the study was to appraise the performance of Ethiopian MFIs in terms of various criteria by comparing with the Micro Banking Bulletin (MBB) benchmark and for some relative ratios comparison among themselves. In order to achieve its objective the study has used variables, micro finance institutions indicator, such as portfolio quality indicators, productivity and efficiency ratios, financial viability indicators, profitability indicators, leverage and capital adequacy ratios as well as scale and depth of outreach indicators. The result of the study indicates that Ethiopian MFIs in general

are poor performers on depth of outreach. They are also poor in terms of the ratio of GLP to assets, allocating a lower proportion of their total assets in to loans. They are also not using their debt capacity properly. The large and smaller MFIs are allocating more loan loss provision expense than the industry average and the related PAR is high for these MFIs. All the MFIs are good at breath of outreach, cost management, efficiency and productivity. They also charge low interest rates. The profitability and sustainability of the MFI depend on their size. MF age correlates positively with efficiency, productivity, the use debt financing and OSS. It is also found that the use of debt financing makes firms more efficient and productive.

Melkamu (2012) has also conducted a research on the Determinants of Operational and Financial Self-Sufficiency, an empirical evidence of Ethiopian Microfinance Institutions. The major objective of the research was to determine factors affecting operational and financial sustainability of microfinance institutions in Ethiopia. In so doing, gross loan portfolio, size of microfinance, personnel productivity ratio, cost per borrower, age of a microfinance, liquidity ratio, number of active borrowers, operating expense ratio as explanatory variables have been used to see their impact on the dependent variable, operational self-sufficiency and financial self-sufficiency ratios. Accordingly, the research has revealed that average loan balance per borrower, size of a MFI, cost per borrowers and yield on gross loan portfolio affects the operational sustainability of Ethiopian MFIs significantly. Whereas cost per borrower, number of active borrowers and yield on gross loan portfolio affect their financial sustainability. The study also found that MFIs in Ethiopia are operationally self-sufficient while they are not financially self-sufficient.

Abebaw (2014) has conducted a research on the Determinants of Financial Performance in Ethiopia to identify the determining factors of financial performance of selected Microfinance Institutions in Ethiopia. The study used age of the MFIs, operational efficiency, portfolio quality, size of MFIs, gearing ratio, real GDP and market concentration as independent variables to investigate their impact on financial performance, return on assets. As a result, the outcome of the study demonstrated that Age of MFIs has a positive but statistically insignificant effect on their financial performance. On the other hand, portfolio at risk, gearing ratio and market concentration affect negatively and not significant.

Muhidin (2015) has made a research on the title "Determinants of Long-Term Sustainability and Efficiency of Ethiopian Microfinance Institutions". The main objective of the study was to empirically test the influence of funding source (capital structure), firm characteristics and macroeconomic variables towards long term sustainability and efficiency of Ethiopian MFIs. In so doing, the researches employed quantitative research approach and used panel data to analyze the resulting estimates so that the stated objectives and hypothesis are addressed. Accordingly, the study has revealed that increased reliance on donor funds erodes sustainability while maintaining higher percentage of deposits as a percent of loans lead to improved sustainability indicating that increased commercialization helps MFI to improve their sustainability. Relying on grants and soft loans found to decrease their self-sufficiency ratio. Similarly, high proportions of women are also found to erode their sustainability due to perceived reason of their small size of loans. The experience of MFI and GDP growth rate also revealed to enhance their sustainability of MFIs.

With regard to efficiency, the study proved that, having grants as a larger percent of assets, erodes efficiency by increasing cost per borrower and is statistically significant at 1%. MFIs'

experience, too, revealed to erode their efficiency by increasing their cost per borrower as a result of MFIs' failure to focus on innovation, technology and economies of scale. On the other hand, large loan sizes found to decrease cost per borrower due to economies of scale.

Generally, researches conducted so far didn't clearly identify the key determinants of performance of microfinance institutions even though they have made an attempt look into the factors that make MFIs financially and operationally self-sufficient. In order to investigate determinants of financial and operational self-sufficiency previous researches have used variables such as efficiency ratios, financial viability indicators, profitability indicators, leverage ratios, scale and depth of outreach, gross loan portfolio, personnel productivity ratio, cost per borrower, liquidity ratio, number of active borrowers, portfolio quality. Moreover, the numbers of MFIs considered in the previous studies were not more than sixteen.

To fill this gap, the research have been designed and included variables such as financial self-sufficiency ratio, operating self-sufficiency ratio, debt to equity ratio, portfolio at risk, loan loss ratio, operating expense ratio and size of microfinance institutions as explanatory variables to explain the dependent variable performance of microfinance institutions in Ethiopia, return on assets. The study has designed these variables based on the theory of Ledgerwood (1999), which explain the relevance of these variables in determining the financial performance of MFIs. Moreover, in addition to the maximum of sixteen sample MFIs considered in the previous studies the study has included six more MFIs to make the total number of MFIs considered in the study twenty-two. This has enabled the research to arrive at best conclusion.

Chapter Three

3. Research Methodology

In this chapter the research approach, sampling and sampling technique used in modeling different data sources, procedure of data analysis and regression models are presented.

3.1. Research Approach

The study used quantitative research approach by using panel research design to investigate the determinants of performance of microfinance institutions operating in Ethiopia. The advantage of using panel data is that, it controls for individual heterogeneity, less collinearity variables and tracks trends in the data something which simple time-series and cross-sectional data cannot provide (Baltagi 2005).

The research used panel data regression models to analyze data collected from secondary sources, annual reports of the selected microfinance institution. Thus, explanatory research design was employed in the study. In addition, testing of the research hypothesis was made on the basis of the regression outputs and the analyses has presented by using descriptive approach.

3.2. Sample and Sampling Technique

Out of the total 36 microfinance institutions in the country, as of June 2015, 22 microfinance institutions operating for more than thirteen years, 2003 to 2015 have been purposively selected. In this research thirteen years data was used as it was found good for the regression model. Secondary data from annual report of those selected microfinance institutions were also used to collect the data. Accordingly, the study has considered a total of 200

observations for the regression analysis. The general rule of thumb for a reasonable size of regression analysis (Harrell's, 2222), Regression Modeling Strategies is at least 10-20 observations per independent variables. In this case, the ratio of observations per independent variables is 22:1 which are acceptable as per the stated standard.

3.3. Sources of Data

The data sources for the study were the microfinance institutions' Annual Reports of 13 years, 2003-2015. The study critically looked into financial statements and notes to financial statements within the annual reports of the selected microfinance institutions.

3.4. Technique of Data Analysis

Basically, the research used a panel multiple regression analysis to analyze the data collected from the above mentioned sources. Accordingly, the regression output explained the relationship between the dependent variable, return on asset, and multiple independent variables. The outputs were obtained from EVIEWS 8 econometric software. The E-views software has been selected because of its ability to help the study to analyze research easily and efficiently (Brooks, 2008).

3.4.1. Regression Model

Return on assets is an overall measure of profitability that reflects both the profit margin and the efficiency of the institution (Eakins, 2012). It tells how effectively a management generates earnings from its investments. As a result, the research adopted Return on Asset (ROA) as dependent variable based on the previous literature, objectives of the study and study area the following independent variables were chosen: Financial Self Sufficiency (FSS), Operational Self Sufficiency (OSS), Debt Equity Ratio (DER), Portfolio at Risk

(PaR), Loan Loss Reserve (LLR), Operating Expense (OE), and Size of Microfinance (SM). Accordingly, the research has used regression analyses with one dependent and seven independent variables.

3.4.1.1. Dependent Variable

Return on Asset (ROA) was used as a measure of microfinance performance rather than ROE. Because as it is indicated by Inter-American Development Bank Sustainable Development Department, 2003, ROE is particularly relevant for private for-profit entity with real flesh-and-blood owners. For them, ROE is a measure of paramount importance since it measures the return on their investment in the institution. However, given that the primary objective of many MFIs is not a profit making, the ROE indicator is most often used as a proxy for commercial viability. As a result, ROA was used as explained variable for the regression model.

3.4.1.2. Independent Variables

Eight independent variables namely, financial self-sufficiency, operational self-sufficiency, debt equity ratio, portfolio at risk, loan loss reserve, operating expense ratio, capital adequacy ratio and size of microfinance were chosen based on previous research works conducted in the area of microfinance institutions performance and other theoretical literature, Ledgerwood (1999). Thus, based on the model adopted by the author, in this study the independent variables have been extracted.

3.4.1.3. Regression Analysis

A panel data regression model was used to determine the relative importance of each independent variable to determine the microfinance institutions performance. The p-value of

explanatory variables was used to test the developed hypotheses at a 1%, 5% and 10% significance level. The multiple regressions model for the dependent variable ROA is presented in the equation below. The study ran two models by using E-views 8 econometric software. The twenty microfinance institutions financial statement shall be used to analyze the determinants of performance of microfinance institutions in Ethiopia. The regression model employed is presented as follows;

$$\mathbf{Y_i = \alpha + \beta 1 X1_i + \beta 2 X2_i + \beta 3 X3_i \ldots + \beta n Xn_i + \varepsilon_i}$$

Standard

I – goes from 1 to N and indicates the observation number

Y_i – The value of dependent variable; ROA- performance indicator

α – The constant term;

β – The coefficient of the function;

X_i – The value of independent variables:

ε_i – The disturbance or error term.

Based on all the above information, the study performed the following regressions:

$$ROA_t = \alpha + \beta_5 FSS_t + \beta_6 DER_t + \beta_1 PaR_t + \beta_2 LLR_t + \beta_3 OER_t + \beta_7 CAR_t + \beta_9 SM_t + \varepsilon t$$

$$ROA_t = \alpha + \beta_4 OSS_t + \beta_6 DER_t + \beta_1 PaR_t + \beta_2 LLR_t + \beta_3 OER_t + \beta_7 CAR_t + \beta_9 SM_t + \varepsilon t$$

Where,

- ROA is the return on asset at time t
- PaR is the portfolio at risk at time t
- LLR is the loan loss ratio at time t
- OER is the operating efficiency ratio at time t

- OSS is the operational self-sufficiency at time t
- FSS is the financial self-sufficiency at time t
- DER is the debt to equity ratio at time t
- CAR is the capital adequacy ratio at time t
- BO is the breadth of outreach at time t
- SM is the size of microfinance institutions at time t
- ε_t is the disturbance or error term.

3.4.1.4. Model Specification Test

There are two broad classes of panel data estimator approaches that can be employed in the empirical research: fixed effects models and random effects models, Brooks (2008). In order to run the regression, the study examined whether individual effects are fixed or random. Therefore, Hausman Test was made to differentiate among the two choices, fixed effects (FE) and a random effects (RE) model. According to this test null hypothesis says that random effects model is appropriate than the fixed effects model (Brooks, 2008, p.509). Accordingly, if the result of the p-value for the test is less than 1%, it indicates the random effects model is not appropriate and that the fixed effects specification is to be preferred, since the null hypothesis is rejected at 1% significance level and vice versa.

Finally, the descriptive statistics of variables was used in the study, correlation analysis between variables, Multicollinearity test, and diagnosis testing on the classical linier regression model assumptions, Autocorrelation DW test, Heterosckedasticity white test and Normality Bera-Jarque test have also been made and explained using Eviews 8 econometric software.

Chapter Four

4. Presentation and Discussion of results

This chapter presents and discusses the results of the study. This includes: model specification test, descriptive statistics of variables, correlation analysis, regression analysis results and discussion. Moreover, diagnosis testing for the basic assumptions of classical linear regression model (CLRM), i.e., auto-correlation test, heterosckedasticity test & normality test, and regression analyses for the microfinance institutions performance as measured by return on asset (ROA) and discussion of results are explained. The analysis of secondary data was made by using E-views 8 econometric software.

4.1. Model Specification Test

As per Brooks, there are broadly two classes of panel data estimator approaches that can be employed in the empirical research: fixed effects models and random effects models (Brooks 2008). Thus, In order to run the regression, the study decided on the appropriate panel regression model between the two panel data estimators- fixed effect and random effect model.

Hausman Test was used on Eviews 8 econometric software, to differentiate between, fixed effects (FE) and a random effects (RE) model. According to this test the null hypothesis says that random effects model is appropriate than the fixed effects model whereas alternative hypothesis says fixed effects model is appropriate than the random effects model (Brooks, 2008). The results indicated that the difference in coefficients between FE and RE is systematic, providing evidence in favor of a FE model. The p-value for the test is less than 1%, i.e., 0.0023 for ROA-Model indicating that the random effects model is not appropriate

and that the fixed effects specification is to be preferred, since the null hypothesis is rejected at 1% significance level. Therefore, the research used the fixed-effect model in order to run the panel regression.

Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.426753	7	0.0023

4.2. Descriptive Statistics of Variables

In this section descriptive statistics of the dependent variable; Return on Asset (ROA) and explanatory variables: Portfolio at Risk (PaR), Loan Loss Reserve Ratio (LLR), Operating Expense Ratio (OER), Operational Self-Sufficiency (OSS), Financial Self-Sufficiency (FSS), Debt Equity Ratio (DER) and Logarithm of Total Assets that are involved in the regression model are presented. Mean, maximum, minimum and standard deviation values are included in the Table 4.1 below. These figures give overall description about the data used in the regression models**.**

The table below shows descriptive statistics for all variables that were employed for the regression. Accordingly, Return on Asset, the dependent variable, has a positive mean value of 0.01, which implies MFIs was gaining average positive return of 0.01 cents in every one birr investment they made on total asset during the study period. When this figure is compared with the Micro Banking Bulletin (MBB) 2014 benchmark data, i.e., -1.9 the ROA performance of Ethiopian MFIs is higher. Similarly, the descriptive statistics in the table below indicates a positive mean value of independent variables, 1.15, 0.81, 1.73, 0.05 and

0.12 for operational self-sufficiency ratio, financial self-sufficiency ratio, debt-to-equity ratio, portfolio-at-risk and operating expense ratio respectively. When these figures are compared with the MBB benchmark they show that, OSS, PAR and LLR performance of Ethiopian MFIs is good. On the other hand, FSS and DER are lower than MBB benchmark, indicating Ethiopian MFIs are not financially self-sufficient and their debt financing is relatively lower than the MBB benchmark. With regard to company size, the mean value of 10,377,867 is significantly lower than the MBB benchmark as it can be seen from the table below. This indicates that total asset of Ethiopian MFIs is low as compared to the MBB benchmark

Table 4.1 Descriptive Statistics of Variables

Dependent variables	MBB	Mean	Max	Min	Std. Dev.
ROA	-1.9	0.01	0.34	-0.78	0.09
Independent Variables	MBB	Mean	Max	Min	Std. Dev.
OSS	0.94	1.15	2.48	0.00	0.56
FSS	1.00	0.81	1.96	0.00	0.44
DER	3.50	1.73	9.90	0.00	1.51
PAR90	0.13	0.05	0.38	0.00	0.06
OER	0.34	0.12	0.58	-0.09	0.10
LLR	0.37	0.01	0.26	0.00	0.14
SIZE	288.4	10.38	10.07	0.00	2.53

Source: E-views 8 output from MFIs financial statements

As it can be seen from the above table, Return on Asset (ROA) has a standard deviation of 0.09 and range of 1.12 which indicated that the data are clustered closely around the mean which is preferable and more reliable for the model. Since the standard deviation of ROA

variable is closer to the average, mean, figure, it is significant enough to support the hypotheses of the study.

In the above table, six explanatory variables that are expected to affect the financial performance of Microfinance Institutions (MFIs): Operational Self-Sufficiency Ratio (OSS), Financial Self-Sufficiency Ratio (FSS), Debt to Equity Ratio (DER), Portfolio-at-Risk less than 90 days (PAR90), Operating Efficiency Ratio (OER), Loan Loss Reserve Ratio (LLR) and microfinance size (logarithm of total asset) have also demonstrated different characteristics. Portfolio-at-Risk for less than 90 days had the lowest positive mean value of 0.05, range of 0.38 and standard deviation of 0.06. This shows that on average, the sampled microfinance institutions had recorded 0.05 percent of portfolio at risk over 2003 to 2015 and the data was consistent as the standard deviation value was higher than and not far from the mean value.

On the other hand, Operating Expense Ratio had a mean value of 0.12 and standard deviation of 0.10. The mean value ascertains the stability and efficiency of microfinance institutions in the management of operating expenses which enhances their profitability. Similarly, Financial Self-Sufficiency Ratio's mean value and standard deviations are 0.81 and 0.44 respectively. This implies that the operating income of MFIs was improving from time to time and, as a result, their financial self-sufficiency position was becoming strong.

Microfinance size (logarithm of total asset), on the other hand has, an average mean value of 10,377,867 and a standard deviation value of 2.53. The minimum and maximum value is 0.00 and 10.07 respectively. This indicates that the range was higher due to the variability of data obtained from MFIs. However, the standard deviation is still below the mean value of

the variable. This suggests that there is a rapid incremental growth in the total asset of microfinance institutions. Similarly, the mean value and the standard deviation of DER, 1.73 and 1.51 respectively indicates the relative increase in debt position of microfinance institutions to their available equity.

Loan loss reserve ratio has a positive mean value of 0.01, the maximum and minimum value is 0.26 and 0.0 respectively which makes the range 0.26. This positive value of loan loss reserve implies that microfinance institutions maintained average positive loan provision for loans under the category of substandard, doubtful and loss.

Generally, it can be said that, from the six independent/explanatory variables, microfinance size, debt-to-equity ratio and financial self-sufficiency ratio have the highest standard deviation of 2.53, 1.51 and 0.44 respectively as compared with other explanatory variables. This indicates that these variables have more significant variance than other explanatory variables considered in the study.

4.3. Correlation Analysis between Explanatory Variables

In this section the correlation between the microfinance's performance indicator (return on asset)and the seven explanatory variables namely: portfolio at risk, loan loss reserve ratio, operating expense ratio, operational self-sufficiency, financial self-sufficiency, debt equity ratio and logarithm of total assets are presented and analyzed. A correlation matrix is used to ensure the correlation between explanatory variables. Cooper & Schindler, (2009) suggest that a correlation coefficient above 0.8 between explanatory variables should be corrected because it is a sign for multicollinearity problem, as quoted by Efrem (2014). Moreover, Mashotra (2007) argue that the correlation coefficient can be 0.75. In addition, Hair *et al.*

(2006) also argued that correlation coefficient below 0.9 may not cause serious multicollinearity problem. Accordingly, all variables in the study meet the above standard and as a result there is no sign of multicollinearity problem on both models of the study. The detailed correlation analyses of the two models are presented as follows.

Table 4.2 Correlation Matrix: Explanatory Variables

	OSS	FSS	DER	PAR90	OER	LLR	SIZE
OSS	1.00						
FSS	0.89	1.00					
DER	0.40	0.42	1.00				
PAR90	-0.02	-0.05	0.15	1.00			
OER	0.03	0.03	-0.07	0.12	1.00		
LLR	0.01	-0.10	0.10	0.13	-0.13	1.00	
SIZE	0.80	0.74	0.50	0.21	0.29	-0.04	1.00

Source: E-views 8 output from MFIs financial statements

As per the table above, financial self-sufficiency ratio has positive correlation coefficient with debt to equity ratio, operating expense ratio and company size, whereas it has negative correlation coefficient with portfolio at risk and loan loss ratio. This finding is consistent with findings such as Haruna S. 2013, Vicki B. et.al, 2007 and Tilahun A, 2013. Debt to equity ratio has positive correlation coefficient with portfolio at risk, loan loss ratio and company size, whereas it has negative correlation coefficient with operating expense ratio. This is supported by previous researches conducted by Melkamu T., 2012 and Vicki B. et.al, 2007. When we look at portfolio at risk, it has positive correlation coefficient with operating expense ratio, loan loss ratio and company size similar to the findings of Ndi G. et.al 2014. Operating expense ratio has also positive and negative correlation coefficient with company size and loan loss ratio respectively which is consistent with findings by and Sara A, 2014.

Comment [H1]: Who and Sara?

The correlation coefficient of loan loss ratio and company size is also negative. This is also similar to research finding of Sara A, 2014.

Generally, since the highest correlation coefficient of -0.74 i.e., between financial self-sufficiency ratio and company size is less than -0.80, it is possible to conclude that there is no serious multicollinearity problem as supported by Studenmund, 2011, which stated that the concern of multicollinearity problem arises when the correlation coefficient exceeds the absolute value of 0.80.

4.4. Regression Analysis: Results and Discussions

In this section regression analysis is presented to show the level of determination of seven explanatory variables on the explained or dependent variable. The regression analyses were done to examine the relationship between microfinance performance indicator, ROA, and independent variables. As a result of the Hausman test made in the first portion of this chapter, running fixed effect model is appropriate.

The Fixed Effect model assumes that the marginal effects of the explanatory variables on the dependent unit are the same for all units of microfinance institutions. The constant term is allowed to vary among the microfinance institutions to account for the differences between units. These constant terms capture all unobserved characteristics that differentiate the units from each other. Since, for example, unique differences and cross-sectional variation between MFIs can play an important role in explaining the variation in ROA among microfinance institutions. The model also assumes that the error terms are homoscedastic and uncorrelated both over time and across MFIs. An advantage of the Fixed Effect method is that it leads to consistent estimates even if the time-invariant component of the error term is

correlated with the regressors, Brooks (2008). It has also been shown that the Fixed Effect estimator is consistent even when the Random Effect model is valid or even if the time-invariant component of the error term is correlated with the regressors (Nguyen 2006).

4.4.1. Diagnosis Tests

Classical Linear Regression Model (CLRM) assumptions were tested after running the regression model for return on asset (ROA). As per Chris Brooks (2008), the first assumption required that the average value of the errors is zero (E (ut) = 0). In fact, if a constant term is included in the regression equation, this assumption will never be violated (Brooks 2008). Since there is no intercept parameter without constant term, the first assumption will never go against and no need of testing it. This means there is no potentially severe bias in the slope coefficient estimates in the regression model. However, the rest assumptions of CLRM were properly tested and presented as follows:

Heterosckedasticity Test: White Test

The second assumption of CLRM states that the variance of the errors is constant, $\sigma 2$ this is known as the assumption of homoscedasticity (Brook 2008). If the errors do not have constant variance, they are said to be heteroskcedastic. In other words, if the residuals of the regression have systematically changing variability over the sample, that is a sign of heteroscedasticity (Chris Brooks 2008). White test was used for general test of heteroscedasticity. As we have seen from the Table 4.3 below, the F- and $\chi 2$ ('LM') versions of the test statistic results of the regression analyses for the two models (Model One and Model Two) gives the same conclusion that there is no evidence for the presence of heterosckedasticity, since the p-values are considerably in excess of 0.05.

Table 4.3 Heteroscedasticity Test Result

Null hypothesis (Ho) = there is no heteroscedasticity; Alternative hypothesis (Ha) = there is heteroscedasticity						
Heteroscedasticity Test Result: White						
	Model 1			**Model 2**		
F-statistic	0.835648	Prob. F(6,278)	0.5432	0.843293	Prob. F(6,278)	0.5374
Obs*R-squared	5.049074	Prob. Chi-Square(6)	0.5375	5.094442	Prob. Chi-Square(6)	0.5318
Scaled explained SS	95.74392	Prob. Chi-Square(6)	0.0000	97.26920	Prob. Chi-Square(6)	0.0000

Source: E-views 8 output from MFIs financial statements

The above table depicts that, both $\chi 2$ and F-test versions of the heteroscedasticity test of both models fail to reject the null hypothesis even at 5% of significant level as their corresponding probability value exceeds 0.05. This indicates the variance of the errors is constant (i.e. there is no problem of heteroscedasticity in both models).

Autocorrelation Test: Durbin-Watson (DW)

According to (Brooks 2008), assumption three, that is made of the CLRM's disturbance terms, says that the covariance between the error terms over time (or cross-sectionally, for that type of data) is zero. In other words, it is assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are 'auto-correlated' or that they are 'serially correlated'.

To test this assumption the Durbin–Watson (DW) formal statistical test was applied. As it is shown in the table 4.4 below, the Durbin-Watson test result is 1.70 and 1.96 for the two models employed in the study respectively. This indicates that there is no serious evidence of

autocorrelation in the data since the Durbin-Watson test result is not much far from two (2). Chris Brooks (2008) pointed out that there is no autocorrelation problem if the DW is near 2 i.e., between 1.5 and 2.5.

Table 4.4 Durbin-Watson Test Result

Ho = There is no autocorrelation; Ha = There is autocorrelation		
	Model one	Model two
DW test	1.70	1.96

Source: E-views 8 output from MFIs financial statements

The forth assumption of CLRM is not violated, Since E (u) = 0.This expression will be zero and therefore the estimator is still unbiased even if the regressors are stochastic. According to Brooks (2008), Ordinary Least Square estimator is consistent and unbiased in the presence of stochastic regressors, provided that the regressors are not correlated with the error term of the estimated equation.

Normality Test: Bera-Jarque (BJ)

The final assumption (assumption five) of classical linier regression model that was done for this research work was normality test. It requires checking whether the disturbances are normally distributed or not (Brooks 2008). In order to do this, one of the most commonly applied tests for normality, i.e., Bera-Jarque (BJ) test was implemented. BJ uses the property of a normally distributed random variable that the entire distribution is characterized by the first two moments, the mean and the variance.

If the residuals are normally distributed, the histogram should be bell-shaped and the Bera-Jarque statistic would not be significant. This means that, the *p-value* given at the bottom of

the normality test screen should not be bigger than 0.05 to not reject the null of normality at the 5% significance level, (Brooks 2008). Accordingly, the Bera-Jarque statistic test result of the model of this study is presented in the table 4.5 below.

Table 4.5 Bera-Jarque Statistical Test Results

Ho = Residual are normality distributed; Ha = Residual are not normality distributed		
	Model one	Model two
BJ test	0.000000	0.000000

Source: E-views 8 output from MFIs financial statements

As can been seen in the above table, the residuals are not normally distributed in both of the two models. Hence the null hypothesis for residual normality is not been rejected as the *p*-value for the BJ test is less than 0.05 and zero to six decimal places for both of the models employed in the research. This implies that the inferences made about the coefficient estimates could be wrong. However, the sample is probably just about large enough that the study needs to be less concerned than it would be with a small sample.

Comment [H2]: Is that?

It is, of course, possible to employ an estimation method that does not assume normality, but such a method may be difficult to implement, and one can be less sure of its properties (Brooks 2008). It is thus desirable to stick to ordinary least square (OLS) if possible since its behavior in a variety of circumstances has been well researched. Moreover, for sample sizes that are sufficiently large, violation of the normality assumption is virtually inconsequential (Brooks 2008). Appealing to a central limit theorem, the test statistics will asymptotically

follow the appropriate distributions even in the absence of error normality. Moreover, the central limit theorem allows ignoring the normality assumption if there are at least ten observations per group. In economic or financial modeling, it is quite often the case that one or two very extreme residuals cause a rejection of the normality assumption.

Therefore, considering the central limit theorem, the law of large numbers states that the average of a sample (which is a random variable) will converge to the population mean (which is fixed), and the central limit theorem that states the sample mean converges to a normal distribution and the scale of the sample size of the study and the result of the JB test; the study assured the existence of normality problem on both models doesn't affect the significance of the model.

4.4.2. Regression Analysis between Explained Variables and Explanatory Variables

In order to examine the relationship between dependent variable, performance indicator of microfinance institution, and explanatory variables, two regression analyses were run on independent model. The two model was adopted basically due to high multicollinearity (more than 80%) problem existed between financial self-sufficiency (FSS) and operational self-sufficiency (OSS) ratios, which prevented the research not to use one model. Since the study was interested to see the impact of both FSS and OSS ratios, it employed two models for each by including the remaining explanatory variables to investigate their level of determination on the profitability of Microfinance Institutions (MFIs). The two regression analyses were undertaken to investigate the relationship between ROA and independent/ explanatory variables. The regression model is presented as follows:

ROA-Model One: First Regression with FSS

ROA = C(1)*FSS + C(2)*DER + C(3)*PAR90 + C(4)*OER + C(5)*LLR + C(6)*SIZE

ROA = 0.102*FSS - 0.002*DER - 0.172*PAR90 - 0.122*OER - 0.002*LLR - 0.015*SIZE

In the following table 4.6, coefficients of variables, standard errors, t-values, and p-values for explanatory variables, and R-squared, Adjusted R-squared, Standard Error of regression, F-statistic, Prob. (F-statistic) for the first regression, i.e., ROA-Model with FSS, and number of observations included in the study are presented.

Table 4.6 Regression Analysis between ROA & Explanatory Variables with FSS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FSS	0.102045	0.016574	6.157078	0.0000
DER	-0.001754	0.003313	-0.529402	0.5970
PAR90	-0.172247	0.070576	-2.440585	0.0153
OER	-0.122122	0.051559	-2.368598	0.0186
LLR	-0.002454	0.031668	-0.077503	0.9383
SIZE	-0.014605	0.003151	-4.634497	0.0000
C	0.061127	0.014167	4.314585	0.0000
Effects Specification				
Period fixed (dummy variables)				
R-squared	0.464527			
Adjusted R-squared	0.428292			
S.E. of regression	0.066129			
Sum squared resid	1.163239			
Log likelihood	379.5350			
F-statistic	12.81984			
Prob(F-statistic)	0.000000			
Total panel (unbalanced) observations: 285				

Source: E-views 8 output from MFIs financial statements

ROA-Model Two: Second Regression with OSS

ROA = C(1)*OSS + C(2)*DER + C(3)*PAR90 + C(4)*OER + C(5)*LLR + C(6)*SIZE

ROA = 0.109*OSS - 0.005*DER - 0.213*PAR90 - 0.089*OER + 0.003*LLR - 0.019*SIZE

In the following table 4.7 coefficients of variables, standard errors, t-values, and p-values for explanatory variables, and R-squared, Adjusted R-squared, Standard Error of regression, F-statistic, Prob. (F-statistic) for the second regression, i.e., ROA-Model with OSS, and number of observations included in the study are presented. Accordingly, the result of explanatory variable operational self-sufficiency ratio (OSS) is explained independently. Moreover, the result of other explanatory variables- debt equity ratio, portfolio at risk ratio, operating expense ratio, loan loss ratio and MFIs size are also explained by comparing and contrasting with the results of the first model.

Table 4.7 Regression Analysis between ROA & Explanatory Variables with OSS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OSS	0.109846	0.017064	6.437384	0.0000
DER	-0.004739	0.004534	-1.045212	0.2970
PAR90	-0.212992	0.096394	-2.209594	0.0281
OER	-0.089306	0.065766	-1.357935	0.1757
LLR	-0.003366	0.034783	0.096762	0.9230
SIZE	-0.018912	0.004852	-3.897858	0.0001
C	0.050405	0.018711	2.693906	0.0076
	Effects Specification			
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.551464			
Adjusted R-squared	0.480064			
S.E. of regression	0.063064			
Sum squared resid	0.974382			
Log likelihood	404.7804			
F-statistic	7.723617			
Prob(F-statistic)	0.000000			
Total panel (unbalanced) observations: 285				

As it can be seen from the above two tables, there is statistically negative relationship between debt to equity ratio, portfolio at risk, operating expense ratio, loan loss ratio & company size and return on asset of microfinance institutions. On the other hand, there is statistically positive relationship among financial self-sufficiency and operational self-sufficiency ratio on return on asset.

The F-statistic that shows the extent to which all explanatory variables jointly explain dependent variable, according to Brooks (2008), that could be mandatory for multiple regression model, is less that even 1 percent of significance level. This implies that all explanatory variables have jointly greater contribution to improve microfinance institutions' performance i.e., Return on Asset.

The coefficient variables also show that there is positive causal relationship between financial self-sufficiency and operational self-sufficiency. This implies that an increase on these variables will result in an increase on performance of microfinance institutions return on asset. On the other hand, there is negative causal relationship between ROA and debt to equity ratio, portfolio at risk, operating expense ratio, loan loss ratio and company size. This indicates that an increase in these explanatory variables will result in a decrease in performance of MFIs, return on asset.

With regard to goodness of fit statistics, it is desirable to look into R-squared value, a measure of how well the regression model actually fits the data. In other words, R-squared is desirable to have an answer to the question, 'how well does the model containing the explanatory variables that was proposed actually explain variations in the dependent variable? (Brooks, 2008). As clearly seen in Table 4.6 and Table 4.7 above, R-squared value for the two ROA regression models is 0.46 and 0.55 respectively. This indicates that the explanatory variables in this study jointly explain about 46 percent and 55 percent of the variation in the profitability measures, return on asset respectively. The remaining 54 percent 45 percent of the variation in the profitability of microfinance institutions is explained by other variables which are not included in the two models.

Moreover, the Adjusted R-Square which shows the percentage of variation explained only by the independent variables that actually affect the dependent variable is 0.43 and 0.48 for the two ROA models respectively. This also signifies the goodness of the model.

Therefore, these explanatory variables together are good explanatory variables of the profitability of microfinance institutions in Ethiopia. Beside this, F-statistics which was used to measure the overall test of significance of the model was presented, and null hypothesis can be clearly rejected in both of the two regression models. Since the p-value is 0.000000, which is sufficiently lower, the model is well fitted at 1 percent level of significance.

4.4.3. Result Discussion

Financial Self-Sufficiency Ratio

Hypothesis testing of the relationship between financial self-sufficiency ratio (FSS) and financial performance of microfinance institutions return on asset.

H0: There is a positive significant causal effect between financial self-sufficiency ratio and return on asset of MFIs.

H1: There is a no positive significant causal effect between financial self-sufficiency ratio and return on asset of MFIs.

Conclusion: Do not reject the H_0 hypothesis since the regression result shows there is a positively significant causal effect between financial self-sufficiency ratio and return on asset of microfinance institutions. The p-value on the regression output i.e., 0.0000 in the above table 4.6 shows, the variable is statistically significant at 1 percent of significant level. This indicates that financial self-sufficiency has a positive contribution to improve profitability. In addition, the beta value or coefficient of 0.102 indicates that there is positive relationship

between return on asset and financial self-sufficiency. This implies that a one percent increase on financial self-sufficiency will result in an increase on profitability of microfinance institutions, return on asset by 10 percent other things remain constant.

Consistent with this finding, Tilahun A. 2013 have found significant positive causal relationship between performance of microfinance institutions and financial self-sufficiency ratio. Thus, relying on funds generated internally will improve profitability and sustainability of MFIs. This helps to improve their outreach, and they can serve large number of clients and the quality of their lives would be improved. This, in turn, helps to achieve the long term goal of an establishment which is reduction of poverty. Therefore, MFIs in Ethiopia have to generate enough revenue to cover all of the operating, financial and loan loss expenses as well as to maintain the value of the equity and quasi-equity in the organization in relation to inflation. The study also revealed that, unless MFIs are financially self-sufficient, the long-term provision of credit services is undermined by the impact of inflation and the continued necessity to rely on donor funds. This will in turn affect the return on asset of MFIs.

Operational Self-Sufficiency Ratio

Hypothesis testing of the relationship between operational self-sufficiency ratio (FSS) and financial performance of microfinance institutions, i.e., return on asset.

H_0: Operational self-sufficiency ratio (OSS) has significant positive effect on return on assets of MFIs.

H_1: Operational self-sufficiency ratio (OSS) has no significant positive effect on return on assets of MFIs.

Conclusion: Do not reject the H_0 hypothesis since the regression result shows that operational self-sufficiency ratio has significant positive effect on performance of microfinance institutions i.e., return on asset. As shown in table 4.7 above, OSS ratio is statistically significant at one percent of significance level. The p-value of this variable is 0.0000 which is less than one percent of significance level. This indicates that operational self-sufficiency ratio has a great contribution to improve the performance of MFIs similar to financial self-sufficiency ratio. The beta value, coefficient of this variable is 0.109 which indicates that there is positive causal relationship between operational self-sufficiency ratio and performance indicator return on asset of Ethiopian microfinance institutions. Meaning, a 1% increase in OSS ratio will result an increase of 0.109 percent on dependent variable return on asset of MFIs other things remain constant.

Vicki , Willene ., et.al(2007) also support the results of this study. Therefore, MFIs have to be operationally self-sufficient to cover all operation related costs such as cash and non-cash expenses, like depreciation and loan loss provision expenses, as well as any cash costs of funds: interest and fees actually paid on debt or to savers. As a result, enabling this will increase the financial performance, return on asset, of MFIs in Ethiopia as per this empirical evidence.

Debt to Equity Ratio

Hypothesis testing of the relationship between debt to equity ratio (DER) and financial performance of microfinance institutions, i.e., return on asset.

H_0: Debt to equity ratio /Capital structure/ have a positive significant effect on return on asset of MFIs.

H_1: Debt to equity ratio /Capital structure/ have a positive significant effect on return on asset of MFIs.

Conclusion: Reject the H_0 hypothesis since the regression results of the two models show that there is a negatively insignificant causal effect between debt to equity (capital structure) ratio and return on asset of microfinance institutions. The p-value of the two models on table 4.6 and table 4.7 above are 0.59 and 0.29 which is considerably higher indicating the variable is statistically insignificant to explain the dependent variable return on asset of MFIs. This indicates that, this variable has little contribution to improve the performance of MFIs. A number of previous studies provide empirical evidence supporting this negative relationship between debt equity ratio and microfinance institutions performance or profitability (Rajan and Zingales, 1995; Wald, 1999; Booth et al, 2001; Fama and French, 2002). Similarly, previous studies made by Ahmadu A. 2015, Ndi G. 2014, Eziedo K. et.al, 2014 have also found insignificant negative relationship between debt-equity ratio and financial performance of MFIs i.e., ROA exactly similar to these findings. On the contrary, Moses 2014 found a weak positive correlation between debt equity ratio and return on assets. This indicates that source of financing a determinant factor of profitability in Ethiopian microfinance industry. Nis may indicate that, MFIs are not good in using debt financing effectively.

The Impact of Portfolio at Risk Ratio

Hypothesis testing of the relationship between portfolio at risk (PAR) and financial performance of microfinance institutions i.e., return on asset.

H_0: Portfolio at risk (PAR) has a negative significant effect on return on asset of MFIs.

H_1: Portfolio at risk (PAR) does not have negative significant effect on return on asset of MFIs.

Conclusion: Reject the H_0 hypothesis since the regression results of the two models show that there is a negative significant causal effect between portfolio at risk ratio and return on asset of microfinance institutions. The p-values of 0.02 and 0.01 on the regression output on table 4.6 and table 4.7 above shows the explanatory variable portfolio at risk ratio is statistically significant at five present of significant level. The beta value or coefficient of this variable is -0.21 and -0.17 for model one and model two respectively which implies there is inverse relationship between portfolio at risk and performance indicator, return on asset, of MFIs. This result is may be explaining the fact that, more microfinance institutions in Ethiopia are exposed to credit risk, higher accumulation of unpaid loans brings a loss of higher interest income which reduces financial performance of MFIs.

This finding is consistent with previous studies made by Sara.(2014), NDI G.(2014), Peter (2012), Richman and Aseidu (2012), Ben Soltane(2012) which have also found a negative significant relationship between financial performance of MFIs and PAR by identifying credit risk as the biggest risk faced by the MFIs globally. This negative relationship proves that a higher portfolio at risk would block good financial performance. This indicates that, if MFIs are not good in managing their loans properly, their resources would be depleted. This reduces loanable funds and minimizes their outreach and sustainability in the future. In addition, the study provides evidence to support the conjecture that increased exposure to credit risk is associated with lower performance of Ethiopian MFIs, given that credit granting is the principal source of revenue for these institutions.

Operating Expense Ratio

Hypothesis testing of the relationship between operating expense ratio (OER) and financial performance of microfinance institutions i.e., return on asset.

H_0: Managerial efficiency, operating expense ratio, has a positive significant effect on return on asset of MFIs.

H_1: Managerial efficiency, operating expense ratio, does not have a positive significant effect on return on asset of MFIs.

Conclusion: Do not reject the H_0 hypothesis since the regression results of the two models shows different result. As per the first model, the variable is statistically significant at 5 percent of significant level. However, the variable is not statistically significant even at 10 percent of significant level on model two. The p-value of operating expense ratio at for model one and model two is 0.01 and 0.17 respectively. This implies that in the first model, operating expense ratio has high contribution the improvement of return on asset of MFIs. However; it has a little contribution to improve return on asset of MFIs in the second model. The result requires further investigation and the study suggests for future researchers since different results were found on the two models. However, there is negative coefficient of -0.12 and -0.08 on model one and model two respectively indicting a 1 percent increase in operating expense ratio will result in a decrease on return on asset of MFIs other things remain constant. Thus, those MFIs that maintain their expenses low will improve their profitability.

Consistent to this finding, NDI G. (2014), Pasiouras and Kosmidou(2007), Bourke(1989)and Kosmidou (2008) have also found that poor expense management is among the main

contributors to poor financial performance of microfinance institutions. The result of regression output is therefore, provide evidence that a rising operational expense ratio which is an indication of weaker or declining level of management efficiency, negatively impacts the financial performance of MFIs, return on asset, in Ethiopia. Thus, the MFIs in Ethiopia should enhance their management efficiency to reduce operating expense ratio and increase their financial performance, return on asset.

Loan Loss Ratio

Hypothesis testing of the relationship between loan loss ratio (LLR) and financial performance of microfinance institutions i.e., return on asset.

H_0: There is a negative significant effect between loan loss ratio and performance, return on asset of MFIs.

H_1: There is no negative significant effect between loan loss ratio and performance, return on asset of MFIs.

Conclusion: Reject the H_0 hypothesis since the regression results of the two models show that there is a negative but insignificant causal effect between loan loss ratio and return on asset of microfinance institutions. The p-value of 0.93 and 0.92 for model one and model two in the above table 4.6 and table 4.7 respectively, shows the variable is statistically insignificant even at 10 percent of significant level as the value is considerably higher. This indicates that, the variable has low level of determination for performance of MFIs, return on asset. On the other hand, the negative beta value or coefficient of -0.002 and -0.003 shows this variable has negative causal relationship with return on asset of MFIs.

Log of Total Asset

Hypothesis testing of the relationship between MFIs size (logarithm of total asset) and financial performance of microfinance institutions i.e., return on asset.

H_0: There is a negative significant causal effect between MFIs size and their performance, return on asset of MFIs.

H_1: There is no negative significant causal effect between MFIs size and their performance, return on asset of MFIs.

Conclusion: Do not reject the H_0 hypothesis since the regression results of the two models show that there is a negative and significant causal effect between logarithm of total asset and return on asset of microfinance institutions. The p-value of 0.00 and 0.00 for model one and model two respectively shows the variable is statistically significant at 1 percent of significance level. The negative beta value or coefficient of -0.014 and -0.018 also shows that, microfinance size has a negative causal relationship with the performance of microfinance institution, return on asset.

Previous studies by Vicki , Willene , et.al(2007) have also revealed negative and significant effect between log of assets and performance of MFIs similar to this finding. This could show that, large firms are not effectively managing organizational resources. And they couldn't capitalize their economies of scale. Unlike this finding, Tilahun A., 2013, has found positive and significant relationship between microfinance size and financial performance return on asset, which may be due to the advantage of the economies of scale.

Generally, the results of regressions on table 4.6 and table 4.7 above show that financial self-sufficiency ratio, operational self-sufficiency ratio and company size are statistically

significant at 1 percent significant level, portfolio at risk and operating expense ratio (on model one) are statistically significant at five percent significance level. This indicates that the above mentioned explanatory variables have a great contribution to improve return on asset of MFIs which is a measure of profitability. However, debts to equity ratio and loan loss ratios are statistically insignificant for both models at one, five and ten percent significance level which indicates these explanatory variables have lower impact on return on asset of MFIs.

Chapter Five

5. Conclusion and Recommendation

Under this chapter major empirical findings of the study are summarized and conclusions are made. Based on the findings of the study appropriate recommendations are made.

5.1. Conclusion

Results from the descriptive and empirical data obtained from the econometric software, can be summarized as follows.

- The result of descriptive analysis shows that, Ethiopian microfinance institutions averagely generate positive ROA. This is an indication that Ethiopia MFIs are generating profit besides their role on poverty eradication.
- Explanatory variables: financial self-sufficiency, operational self-sufficiency, debt to equity ratio, portfolio at risk, operating expense ratio and microfinance size also have positive mean value.
- Financial self-sufficiency and operational self-sufficiency variables strengthen the performance of microfinance institutions, return on asset.
- Portfolio at risk, operating expense ratio and microfinance size reduces the performance of microfinance institutions.
- Debts to equity ratio and loan loss ratio have little impact on performance of microfinance institutions.
- R-squared value for the two ROA regression models is 0.46 and 0.55 respectively. This indicates that the explanatory variables in this study jointly explain about 46 percent and 55 percent of the variation in the profitability measures, return on asset respectively. The

remaining 54 percent 45 percent of the variation in the profitability of microfinance institutions is explained by other variables which are not included in the two models.

- The Adjusted R-Square is 0.43 and 0.48 for model one and model two models respectively, which tells the percentage of variation explained by only the independent variables.
- Financial self-sufficiency ratio is statistically significant at 1 percent of significant level and the variable have a great contribution to improve return on asset of MFIs.
- There is positive causal relationship between return on asset and explanatory variables: financial self-sufficiency. As a result, an increase of financial self-sufficiency ratio will increase return on asset of MFIs.
- Operational self-sufficiency ratio has statistically significant at one percent of significance level and has great contribution in the improvement of return on asset of MFIs.
- There is positive causal relationship between operational self-sufficiency ratio and performance of MFIs.
- Debt to equity ratio is statistically insignificant at one percent of significance level implying its little contribution to improve the performance of MFIs.
- There is negative causal relationship between debt to equity ratio and return on asset of MFI. In other words, a high debt to equity ratio would limit the performance, return on asset, of MFIs.
- Portfolio at risk ratio is statistically significant at five percent of significant level and has negative causal relationship with return on asset of MFIs. As a result, a high portfolio-at-risk would limit the profitability of MFIs.

- Operating expense ratio is statistically significant at five percent on model one and statistically insignificant on model two as its respective p-value is 0.01 and 0.17 respectively.
- There is negative coefficient between operating expense ratio and return on asset on both models.
- Loan loss ratio is statistically insignificant at one years of significance level for both models and it has low level of determination for performance of MFIs, return on asset.
- Microfinance institutions size, logarithm of total asset is also statistically significant at one present significance level.
- There is negative coefficient between logarithm of total asset and performance of microfinance institution, return on asset.
- The F-statistic is less than one percent of significance level which implies that all explanatory variables jointly have a greater contribution to improve microfinance institutions' performance i.e., Return on Asset.
- Based on these findings, it can be concluded that financial performance microfinance institutions, return on asset, is highly affected by the financial self-sufficiency ratio, operational self-sufficiency ratio, portfolio at risk ratio and microfinance size.

5.1.1. Recommendations

Based on the findings of the research, the study has recommended certain points what he thought to be very critical if accordingly and properly considered and implemented by the microfinance institutions. Accordingly, based on the above conclusion the following recommendations have been given.

- Financial self-sufficiency, operational self-sufficiency, portfolio at risk and operating expense ratio and microfinance size are significant determinants of performance of MFIs in Ethiopia. Therefore, the managements of MFIs should give great emphasis in properly managing these explanatory variables.
- The MFIs managers and policy makers attention to should perform their primary objective of eradicating poverty through increased profitability by periodically revisiting the key determinants of performance of MFIs.
- In order to ensure their long run funding requirement and sustain their key role in the provision of credit facilities to the poor society, MFIs have to emulate profit-making investment practices by implementing a sound financial management and good management on the internal factors that affect their performance.
- The government should create conducive environment by availing different facilities and infrastructures for MFIs as they are key player in achieving national goals.
- The supervisory organ of the government, National Bank of Ethiopia, should also critically examine the determinants of MFIs performance and consider them while passing various regulations and directives.

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Appendix

Appendix I:

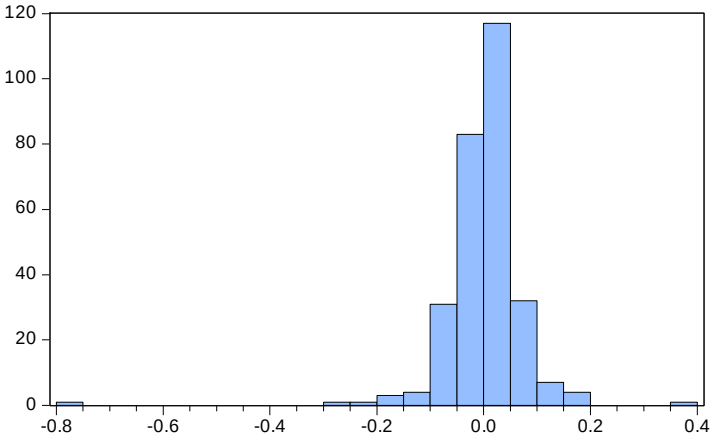
Correlation Matrix between Explanatory Variables

	OSS	FSS	DER	PAR90	OER	LLR	SIZE
OSS	1.00						
FSS	0.89	1.00					
DER	0.40	0.42	1.00				
PAR90	-0.02	-0.05	0.15	1.00			
OER	0.03	0.03	-0.07	0.12	1.00		
LLR	0.01	-0.10	0.10	0.13	-0.13	1.00	
SIZE	0.80	0.74	0.50	0.21	0.29	-0.04	1.00

Appendix II:

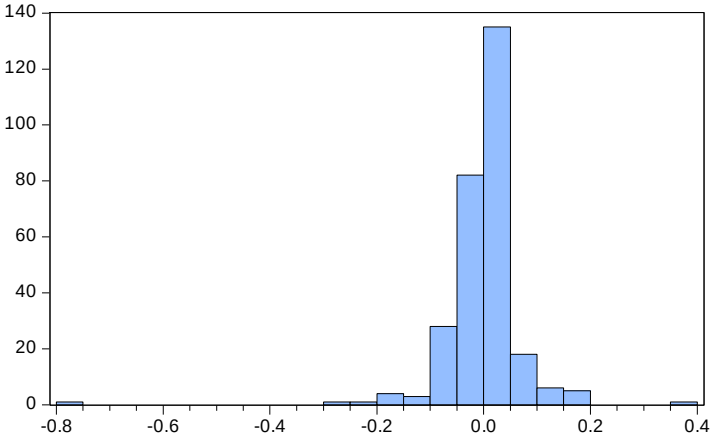
Normality Test: Bera-Jarque

Model One



Series: Residuals	
Sample 1 286	
Observations 285	
Mean	-1.95e-18
Median	0.008856
Maximum	0.364426
Minimum	-0.776091
Std. Dev.	0.076764
Skewness	-3.387550
Kurtosis	40.85930
Jarque-Bera	17565.84
Probability	0.000000

Model Two



Series: Residuals	
Sample 1 286	
Observations 285	
Mean	3.00e-17
Median	0.007775
Maximum	0.394787
Minimum	-0.760618
Std. Dev.	0.075528
Skewness	-3.220321
Kurtosis	41.13367
Jarque-Bera	17760.95
Probability	0.000000

Appendix III:

Model 1: Heteroskedasticity Test: White

Heteroskedasticity Test: White

F-statistic	0.835648	Prob. F(6,278)	0.5432
Obs*R-squared	5.049074	Prob. Chi-Square(6)	0.5375
Scaled explained SS	95.74392	Prob. Chi-Square(6)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/19/16 Time: 02:35
Sample: 1 286
Included observations: 285

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003557	0.005957	0.597066	0.5509
FSS^2	-0.005659	0.004178	-1.354484	0.1767
DER^2	-0.000132	0.000215	-0.612430	0.5408
PAR^2	-0.084841	0.126563	-0.670347	0.5032
OER^2	0.071659	0.052773	1.357872	0.1756
LLR^2	-0.003339	0.016575	-0.201463	0.8405
SIZE^2	0.000116	0.000127	0.909834	0.3637

R-squared	0.017716	Mean dependent var	0.005872
Adjusted R-squared	-0.003484	S.D. dependent var	0.037138
S.E. of regression	0.037203	Akaike info criterion	-3.720625
Sum squared resid	0.384760	Schwarz criterion	-3.630915
Log likelihood	537.1891	Hannan-Quinn criter.	-3.684663
F-statistic	0.835648	Durbin-Watson stat	1.993148
Prob(F-statistic)	0.543195		

Appendix IV:

Model 2: Heteroskedasticity Test: White

Heteroskedasticity Test: White

F-statistic	0.843293	Prob. F(6,278)	0.5374
Obs*R-squared	5.094442	Prob. Chi-Square(6)	0.5318
Scaled explained SS	97.26920	Prob. Chi-Square(6)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/19/16 Time: 02:21
Sample: 1 286
Included observations: 285

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002883	0.005823	0.495037	0.6210
OSS^2	-0.003875	0.002399	-1.615147	0.1074
DER^2	-0.000140	0.000210	-0.664949	0.5066
PAR^2	-0.098434	0.123393	-0.797728	0.4257
OER^2	-0.050393	0.051850	0.971895	0.3319
LLR^2	-0.004477	0.016104	-0.278016	0.7812
SIZE^2	0.000169	0.000138	1.229544	0.2199

R-squared	0.017875	Mean dependent var	0.005684
Adjusted R-squared	-0.003322	S.D. dependent var	0.036075
S.E. of regression	0.036135	Akaike info criterion	-3.778849
Sum squared resid	0.362997	Schwarz criterion	-3.689139
Log likelihood	545.4860	Hannan-Quinn criter.	-3.742887
F-statistic	0.843293	Durbin-Watson stat	1.994935
Prob(F-statistic)	0.537391		

Appendix V:

Model 1: Regression Result

Dependent Variable: ROA
Method: Panel Least Squares
Date: 04/16/16 Time: 00:22
Sample: 2003 2015
Periods included: 13
Cross-sections included: 22
Total panel (unbalanced) observations: 285

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FSS	0.102045	0.016574	6.157078	0.0000
DER	-0.001754	0.003313	-0.529402	0.5970
PAR90	-0.172247	0.070576	-2.440585	0.0153
OER	-0.122122	0.051559	-2.368598	0.0186
LLR	-0.002454	0.031668	-0.077503	0.9383
SIZE	-0.014605	0.003151	-4.634497	0.0000
C	0.061127	0.014167	4.314585	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.464527	Mean dependent var	0.014912
Adjusted R-squared	0.428292	S.D. dependent var	0.087459
S.E. of regression	0.066129	Akaike info criterion	-2.530070
Sum squared resid	1.163239	Schwarz criterion	-2.286571
Log likelihood	379.5350	Hannan-Quinn criter.	-2.432457
F-statistic	12.81984	Durbin-Watson stat	1.704025
Prob(F-statistic)	0.000000		

Appendix VI:

Model 2: Regression Result

Dependent Variable: ROA
Method: Panel Least Squares
Date: 04/16/16 Time: 23:29
Sample: 2003 2015
Periods included: 13
Cross-sections included: 22
Total panel (unbalanced) observations: 285

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OSS	0.109846	0.017064	6.437384	0.0000
DER	-0.004739	0.004534	-1.045212	0.2970
PAR90	-0.212992	0.096394	-2.209594	0.0281
OER	-0.089306	0.065766	-1.357935	0.1757
LLR	-0.003366	0.034783	0.096762	0.9230
SIZE	-0.018912	0.004852	-3.897858	0.0001
C	0.050405	0.018711	2.693906	0.0076

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.551464	Mean dependent var	0.014912
Adjusted R-squared	0.480064	S.D. dependent var	0.087459
S.E. of regression	0.063064	Akaike info criterion	-2.559862
Sum squared resid	0.974382	Schwarz criterion	-2.047232
Log likelihood	404.7804	Hannan-Quinn criter.	-2.354362
F-statistic	7.723617	Durbin-Watson stat	1.965116
Prob(F-statistic)	0.000000		

Appendix VII:

Raw Data Used for Regression

MFI Code	Year	ROA	FSS	OSS	DER	PaR	OER	LLR	Log Asset (Size)
1	2003	4.00%	137.00%	178.40%	1.60	1.70%	5.40%	2.20%	8.46
1	2004	4.80%	156.00%	231.80%	2.00	0.50%	4.30%	1.50%	8.66
1	2005	4.30%	150.10%	200.00%	2.10	1.10%	4.40%	1.00%	8.77
1	2006	4.50%	146.00%	223.90%	2.30	0.80%	3.90%	1.00%	8.93
1	2007	4.10%	139.40%	226.40%	2.70	0.50%	3.70%	0.90%	9.11
1	2008	8.00%	88.00%	240.00%	2.20	2.00%	3.00%	0.79%	9.29
1	2009	6.00%	168.00%	210.00%	2.80	4.00%	3.00%	1.75%	9.37
1	2010	4.00%	176.00%	223.00%	2.60	3.50%	1.40%	2.09%	9.40
1	2011	6.60%	123.00%	214.00%	2.59	1.46%	4.81%	1.79%	9.52
1	2012	7.10%	134.00%	244.00%	2.58	1.00%	3.90%	0.80%	9.64
1	2013	8.53%	140.02%	224.77%	2.75	0.59%	9.58%	0.85%	9.77
1	2014	6.50%	146.32%	214.00%	3.17	0.75%	8.51%	0.94%	9.93
1	2015	6.16%	152.90%	205.44%	3.34	0.47%	8.98%	0.00%	10.07
2	2003	-7.80%	60.40%	84.90%	0.22	7.80%	9.10%	5.90%	7.24
2	2004	-5.90%	54.00%	103.00%	0.13	20.60%	5.10%	3.30%	7.78
2	2005	0.50%	106.60%	197.30%	0.43	0.90%	3.20%	2.20%	8.15
2	2006	-6.50%	50.40%	135.20%	0.40	3.50%	3.00%	1.50%	8.24
2	2007	-8.10%	49.10%	156.00%	0.50	0.00%	3.30%	1.30%	8.37
2	2008	4.00%	29.00%	129.00%	0.43	3.00%	3.00%	0.65%	8.47
2	2009	3.00%	146.00%	177.00%	0.40	4%	3.00%	1.37%	8.59
2	2010	4.00%	137.00%	195.00%	0.54	4.60%	2.50%	1.61%	8.72
2	2011	3.10%	109.00%	166.00%	1.03	3.78%	3.38%	2.03%	8.88
2	2012	3.40%	92.58%	141.00%	1.60	2.50%	4.50%	1.34%	9.08
2	2013	3.90%	111.86%	170.35%	2.62	2.96%	8.69%	0.00%	9.19
2	2014	4.30%	115.48%	175.87%	2.98	2.99%	8.25%	1.05%	9.19
2	2015	4.80%	113.03%	172.14%	3.07	4.22%	8.35%	0.00%	9.19
3	2003	-9.40%	64.90%	91.30%	0.76	11.60%	17.40%	0.60%	6.46
3	2004	-10.1%	63.10%	73.20%	0.56	2.30%	12.60%	14.30%	6.67
3	2005	-8.0%	61.90%	76.80%	0.61	3.30%	10.20%	14.90%	6.90
3	2006	-7.8%	61.20%	86.50%	0.70	4.30%	9.70%	13.20%	7.07
3	2007	-5.7%	74.40%	125.90%	0.60	5.40%	11.10%	4.50%	7.16
3	2008	1.0%	34.00%	106.00%	0.61	10.00%	9.00%	0.06%	7.22
3	2009	3.0%	10.30%	105.00%	0.60	9.00%	12.00%	0.03%	7.24
3	2010	-2.0%	78.00%	81.00%	0.80	3.60%	20.30%	0.06%	7.30
3	2011	-1.8%	59.00%	82.00%	0.80	7.39%	26.78%	0.02%	7.30
3	2012	3.2%	89.00%	125.00%	0.81	1.00%	22.20%	0.01%	7.32
3	2013	-0.7%	68.93%	96.81%	1.33	4.37%	31.32%	0.00%	7.40
3	2014	-1.7%	65.54%	92.06%	1.33	2.60%	35.16%	0.00%	7.41

MFI Code	Year	ROA	FSS	OSS	DER	PaR	OER	LLR	Log Asset (Size)
3	2015	0.1%	71.65%	100.63%	1.51	2.11%	32.89%	0.00%	7.43
4	2003	-4.60%	86.60%	104.10%	0.20	5.80%	24.00%	5.60%	6.57
4	2004	-5.10%	80.20%	100.40%	0.30	3.90%	17.80%	2.10%	6.80
4	2005	-8.50%	64.20%	76.50%	0.50	0.40%	18.20%	1.30%	7.01
4	2006	-1.30%	94.40%	124.50%	0.50	1.20%	16.40%	-0.10%	7.18
4	2007	-0.80%	96.90%	130.00%	1.30	1.30%	17.20%	0.50%	7.46
4	2008	7.00%	82.00%	145.00%	1.22	2.00%	13.00%	0.01%	7.64
4	2009	7.00%	120.00%	145.00%	1.00	2.00%	12.00%	0.02%	7.78
4	2010	7.00%	137.00%	147.00%	1.02	1.60%	12.70%	0.01%	7.78
4	2011	14.10%	114.00%	90.00%	0.90	0.68%	12.59%	0.01%	7.92
4	2012	23.00%	104.00%	151.00%	1.15	0.60%	15.90%	0.00%	8.09
4	2013	19.01%	102.55%	148.89%	1.56	0.51%	45.31%	-17.17%	8.28
4	2014	9.27%	112.68%	163.61%	1.70	0.47%	17.03%	-32.45%	8.42
4	2015	8.25%	109.58%	159.10%	1.75	1.15%	17.46%	-46.11%	8.53
5	2003	-0.50%	95.70%	180.40%	1.30	6.20%	3.30%	12.40%	8.47
5	2004	2.10%	125.30%	215.50%	1.90	2.30%	2.80%	7.10%	8.70
5	2005	3.40%	151.40%	197.30%	3.30	0.00%	2.10%	0.00%	8.96
5	2006	1.90%	127.10%	193.80%	3.70	0.00%	1.80%	0.00%	9.02
5	2007	-0.30%	96.60%	173.40%	3.90	0.50%	2.00%	1.80%	9.20
5	2008	2.00%	44.00%	130.00%	4.01	2.00%	2.00%	2.94%	9.27
5	2009	3.00%	166.00%	202.00%	1.60	5.00%	2.00%	4.94%	9.32
5	2010	0.00%	88.00%	102.00%	3.13	6.70%	1.20%	4.43%	9.33
5	2011	1.90%	107.00%	172.00%	3.16	2.16%	1.88%	2.15%	9.43
5	2012	2.50%	101.00%	139.00%	3.06	4.50%	4.40%	3.26%	9.48
5	2013	1.66%	85.62%	117.83%	3.63	11.37%	14.24%	1.76%	9.56
5	2014	2.72%	104.82%	144.26%	3.74	4.26%	9.37%	1.99%	9.63
5	2015	2.71%	97.35%	133.98%	3.56	6.83%	12.06%	0.00%	9.67
6	2003	-15.50%	40.60%	60.80%	0.70	18.60%	14.20%	0.00%	6.95
6	2004	-12.30%	45.20%	72.50%	1.50	4.60%	11.00%	0.00%	7.07
6	2005	-5.70%	91.40%	109.70%	1.30	8.10%	9.90%	0.00%	7.22
6	2006	-11.20%	60.70%	93.70%	1.40	12.10%	11.10%	0.00%	7.18
6	2007	-7.80%	73.30%	113.50%	1.20	15.60%	12.10%	12.00%	7.21
6	2008	2.00%	49.00%	112.00%	3.00	26.00%	12.00%	0.10%	7.26
6	2009	1.00%	107.00%	130.00%	0.03	24%	16.00%	0.11%	7.32
6	2010	2.00%	66.00%	69.00%	0.01	14%	17.80%	0.13%	7.26
6	2011	7.30%	57.00%	72.00%	1.34	11.06%	20.36%	0.06%	7.32
6	2012	7.30%	57.00%	72.00%	2.23	11.00%	20.00%	0.05%	7.37
6	2013	0.01%	79.20%	100.04%	2.08	4.84%	25.36%	-0.02%	7.45
6	2014	-1.24%	74.86%	94.56%	2.45	5.64%	28.46%	-0.01%	7.51
6	2015	3.63%	92.87%	117.31%	2.55	4.46%	25.77%	-0.02%	7.59
7	2003	-6.7%	76.30%	88.70%	1.20	9.70%	11.40%	12.50%	6.39
7	2004	-8.70%	69.30%	110.30%	5.30	17.70%	11.50%	14.80%	6.56
7	2005	-4.20%	79.30%	85.30%	5.50	7.00%	11.80%	17.30%	6.71
7	2006	7.60%	142.60%	158.00%	2.00	2.91%	11.90%	6.00%	7.01

MFI Code	Year	ROA	FSS	OSS	DER	PaR	OER	LLR	Log Asset (Size)
7	2007	2.40%	111.10%	134.30%	2.50	2.90%	10.10%	2.80%	7.21
7	2008	3.00%	72.00%	124.00%	2.27	4.04%	8.00%	0.07%	7.29
7	2009	0.00%	112.00%	136.00%	2.80	16.00%	9.00%	0.12%	7.35
7	2010	-2.00%	88.00%	90.00%	3.42	23.80%	10.20%	0.12%	7.39
7	2011	6.50%	107.00%	124.00%	2.63	21.33%	10.66%	0.07%	7.44
7	2012	9.50%	127.00%	157.00%	1.98	10.20%	13.20%	0.03%	7.51
7	2013	11.62%	141.83%	175.33%	1.91	4.14%	17.86%	-0.33%	7.65
7	2014	10.35%	134.21%	165.91%	1.52	3.21%	18.20%	-0.31%	7.72
7	2015	8.70%	120.86%	149.41%	1.43	4.21%	19.69%	-0.34%	7.81
8	2003	-6.5%	64.40%	94.90%	0.60	7.80%	7.50%	0.00%	7.93
8	2004	-0.70%	94.80%	152.30%	0.90	5.00%	-9.30%	0.00%	8.06
8	2005	1.10%	110.10%	146.80%	0.90	5.30%	5.60%	0.00%	8.27
8	2006	0.40%	103.50%	181.60%	1.30	0.20%	5.10%	1.30%	8.41
8	2007	0.70%	105.50%	166.40%	2.50	0.00%	4.80%	1.80%	8.71
8	2008	4.00%	63.00%	153.00%	3.48	3.00%	3.00%	0.96%	8.89
8	2009	3.00%	161.00%	195.00%	3.10	7.00%	4.00%	2.44%	8.95
8	2010	3.00%	133.00%	145.00%	3.14	4.60%	3.00%	1.89%	9.14
8	2011	5.40%	113.00%	160.00%	2.80	3.52%	5.02%	1.84%	9.23
8	2012	6.50%	128.00%	205.00%	2.47	3.20%	4.50%	0.68%	9.34
8	2013	6.13%	101.94%	163.27%	2.95	2.87%	12.83%	0.25%	9.47
8	2014	4.77%	93.13%	149.15%	4.05	3.62%	10.14%	0.75%	9.66
8	2015	5.12%	95.25%	152.56%	3.16	5.31%	8.72%	0.00%	9.67
9	2003	-10.90%	49.10%	88.70%	4.80	11.40%	8.50%	26.30%	7.67
9	2004	-6.10%	62.50%	106.40%	6.00	5.50%	8.40%	26.00%	7.79
9	2005	-2.00%	82.60%	111.60%	9.90	1.20%	5.60%	17.50%	8.07
9	2006	-0.50%	95.80%	140.50%	9.10	2.90%	5.50%	10.50%	8.15
9	2007	-1.30%	89.60%	122.20%	7.10	2.00%	6.30%	5.70%	8.39
9	2008	2.00%	73.00%	129.00%	1.15	5.00%	4.00%	3.27%	8.67
9	2009	2.00%	84.00%	102.00%	9.40	7.00%	2.00%	2.74%	8.77
9	2010	0.00%	95.00%	103.00%	2.66	6.60%	4.20%	4.21%	8.80
9	2011	1.40%	78.00%	116.00%	3.09	15.16%	5.12%	9.51%	8.87
9	2012	2.60%	81.00%	110.00%	4.62	9.40%	8.20%	7.63%	8.90
9	2013	4.08%	106.49%	144.61%	4.75	6.45%	12.83%	0.65%	9.27
9	2014	2.94%	102.46%	139.14%	5.81	4.20%	10.14%	0.58%	9.27
9	2015	3.60%	113.87%	154.64%	5.85	3.59%	8.72%	0.00%	9.27
10	2003	-5.30%	67.40%	80.40%	1.30	0.20%	12.70%	0.00%	6.89
10	2004	3.4%	120.20%	152.50%	1.30	0.10%	11.80%	0.00%	7.05
10	2005	-3.0%	80.60%	103.10%	2.60	0.10%	9.20%	0.10%	7.29
10	2006	5.9%	141.40%	195.80%	2.73	0.67%	7.10%	0.00%	7.47
10	2007	5.2%	137.10%	187.70%	2.19	0.50%	6.70%	0.20%	7.57
10	2008	7.0%	78.00%	165.00%	1.92	0.00%	7.00%	0.01%	7.64
10	2009	2.0%	101.00%	123.00%	2.10	6.00%	5.00%	0.01%	7.69
10	2010	7.0%	101.00%	107.00%	1.67	0.40%	9.10%	0.04%	7.72
10	2011	9.3%	100.00%	143.00%	1.25	0.34%	11.76%	0.00%	7.75

MFI Code	Year	ROA	FSS	OSS	DER	PaR	OER	LLR	Log Asset (Size)
10	2012	6.5%	100.00%	134.00%	1.00	0.10%	13.70%	0.00%	7.81
10	2013	9.4%	120.22%	161.09%	1.32	0.14%	18.18%	-88.60%	7.92
10	2014	7.1%	109.40%	146.60%	1.36	0.17%	17.69%	-118.21%	8.00
10	2015	3.3%	89.57%	120.03%	1.29	0.21%	19.55%	-123.94%	8.02
11	2003	-4.00%	79.30%	106.10%	0.91	0.90%	12.10%	1.50%	7.05
11	2004	-3.30%	80.60%	103.70%	1.03	1.50%	10.80%	3.90%	7.15
11	2005	-3.40%	80.70%	104.40%	0.81	4.30%	9.60%	5.40%	7.27
11	2006	-2.70%	84.60%	126.70%	0.90	3.10%	9.70%	2.90%	7.41
11	2007	-9.30%	59.40%	111.30%	1.80	1.80%	9.90%	6.10%	7.53
11	2008	3.00%	54.00%	119.00%	1.17	4.00%	9.00%	0.03%	7.63
11	2009	1.00%	99.00%	120.00%	1.30	3.00%	10.00%	0.03%	7.73
11	2010	7.00%	136.00%	161.00%	1.23	3.20%	4.60%	0.02%	7.79
11	2011	6.80%	93.00%	143.00%	1.16	5.99%	13.09%	0.02%	7.84
11	2012	7.60%	96.00%	144.00%	1.34	2.70%	12.20%	0.03%	7.97
11	2013	16.00%	100.98%	151.48%	1.76	2.36%	41.56%	-0.16%	8.15
11	2014	7.51%	104.66%	156.99%	1.60	3.06%	17.79%	-0.20%	8.21
11	2015	6.06%	94.72%	142.08%	1.98	2.38%	19.10%	-0.25%	8.35
12	2003	-3.8%	78.80%	88.60%	0.80	5.30%	11.90%	4.50%	7.31
12	2004	-2.50%	88.00%	115.50%	1.10	3.50%	12.90%	4.50%	7.42
12	2005	-2.10%	90.90%	107.10%	1.50	3.30%	15.20%	2.20%	7.50
12	2006	1.10%	105.20%	129.10%	1.10	4.70%	15.20%	1.20%	7.73
12	2007	-78.00%	72.40%	99.10%	1.70	2.70%	16.90%	2.20%	7.86
12	2008	0.00%	56.00%	96.00%	1.25	3.85%	15.00%	0.01%	7.97
12	2009	-2.00%	88.00%	107.00%	1.30	4.95%	18.00%	0.03%	8.03
12	2010	-1.00%	66.00%	71.00%	0.77	6.94%	14.40%	0.06%	8.08
12	2011	-2.60%	79.94%	86.00%	1.08	2.11%	16.75%	0.02%	8.14
12	2012	1.30%	89.24%	96.00%	1.10	1.40%	16.00%	0.01%	8.40
12	2013	19.52%	187.88%	202.11%	1.07	0.92%	26.69%	0.02%	8.58
12	2014	4.87%	116.99%	125.85%	0.92	4.48%	27.49%	-0.09%	8.64
12	2015	10.08%	147.30%	158.46%	0.83	2.23%	23.39%	-0.10%	8.70
13	2003	1.70%	107.70%	139.90%	0.40	5.90%	12.80%	1.20%	6.53
13	2004	3.40%	118.40%	145.20%	0.90	0.10%	11.80%	4.50%	6.91
13	2005	-5.10%	75.90%	99.20%	1.10	7.60%	9.80%	4.40%	7.13
13	2006	-1.60%	91.20%	113.00%	1.10	0.88%	10.00%	4.30%	7.42
13	2007	0.30%	101.70%	147.90%	1.20	1.70%	8.20%	-0.30%	7.58
13	2008	6.00%	78.00%	162.00%	1.97	2.00%	7.00%	0.01%	7.73
13	2009	8.00%	152.00%	184.00%	2.20	1.00%	4.00%	0.00%	7.93
13	2010	3.00%	130.00%	145.00%	2.19	4.10%	3.30%	0.03%	7.98
13	2011	6.40%	118.00%	163.00%	1.88	2.25%	7.13%	0.02%	8.11
13	2012	7.50%	128.00%	185.00%	2.08	1.30%	7.70%	0.01%	8.28
13	2013	6.30%	103.38%	149.42%	2.14	0.46%	15.69%	-25.99%	8.38
13	2014	5.64%	96.56%	139.55%	2.38	0.58%	17.32%	-54.95%	8.49
13	2015	4.24%	91.63%	132.44%	3.80	2.01%	16.70%	-49.61%	8.64
14	2003	0.73%	77.37%	93.38%	1.58	0.14%	14.26%	0.02%	6.81

MFI Code	Year	ROA	FSS	OSS	DER	PaR	OER	LLR	Log Asset (Size)
14	2004	7.71%	79.78%	96.28%	2.01	0.56%	10.23%	-0.01%	6.98
14	2005	6.05%	82.19%	99.19%	2.63	0.22%	8.07%	0.18%	7.26
14	2006	7.32%	84.59%	102.09%	2.08	0.63%	8.13%	0.00%	7.49
14	2007	-3.00%	87.00%	105.00%	2.55	9.65%	10.00%	-9.80%	7.59
14	2008	0.18%	62.00%	101.00%	2.80	11.00%	11.00%	0.04%	7.63
14	2009	1.09%	75.50%	96.50%	2.86	14.00%	13.00%	0.12%	7.67
14	2010	2.00%	89.00%	92.00%	3.05	17.00%	15.00%	0.16%	7.66
14	2011	-0.30%	71.00%	86.00%	3.15	12.53%	15.24%	0.12%	7.66
14	2012	12.40%	56.00%	77.00%	0.62	5.10%	26.60%	0.05%	7.80
14	2013	8.17%	83.79%	115.20%	2.44	3.43%	58.04%	-0.12%	7.80
14	2014	2.52%	81.39%	111.92%	2.27	4.55%	23.56%	-0.13%	7.82
14	2015	1.69%	78.35%	107.73%	1.82	3.75%	24.51%	-0.12%	7.78
15	2003	-35.39%	4.36%	6.57%	0.01	5.33%	41.18%	0.09%	6.24
15	2004	-28.81%	17.02%	25.68%	0.01	9.57%	36.55%	0.05%	6.29
15	2005	-22.22%	29.68%	44.79%	0.01	13.81%	31.91%	0.00%	6.46
15	2006	-13.24%	42.34%	63.89%	0.03	6.59%	26.41%	0.00%	6.71
15	2007	-3.90%	55.00%	83.00%	0.31	6.91%	16.76%	4.34%	6.97
15	2008	0.36%	39.00%	102.00%	0.28	9.00%	18.00%	0.04%	7.07
15	2009	-1.00%	96.00%	116.00%	0.25	11.36%	17.00%	0.05%	7.18
15	2010	-2.00%	43.00%	62.00%	0.27	12.00%	5.00%	0.09%	7.21
15	2011	0.50%	45.00%	85.00%	0.97	12.83%	18.93%	0.02%	7.24
15	2012	0.60%	55.00%	99.00%	0.63	4.60%	15.70%	0.02%	7.43
15	2013	24.11%	102.82%	185.07%	1.14	1.62%	37.11%	0.00%	7.63
15	2014	7.91%	93.60%	168.47%	1.40	1.46%	15.93%	0.00%	7.88
15	2015	6.75%	87.62%	157.72%	2.51	2.21%	16.85%	0.00%	8.15
16	2003	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
16	2004	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
16	2005	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
16	2006	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
16	2007	-9.00%	41.00%	65.00%	1.50	0.00%	11.00%	0.00%	7.40
16	2008	0.00%	36.00%	97.00%	1.47	8.00%	11.00%	0.05%	7.50
16	2009	0.50%	54.50%	87.00%	1.85	9.50%	12.50%	0.04%	7.53
16	2010	1.00%	73.00%	77.00%	2.22	11.00%	14.00%	0.04%	7.56
16	2011	1.90%	92.00%	111.00%	2.51	4.09%	14.86%	0.05%	7.69
16	2012	4.00%	98.00%	120.00%	2.71	4.10%	11.00%	0.06%	7.69
16	2013	3.85%	106.00%	120.55%	4.18	0.92%	22.10%	18.80%	8.01
16	2014	5.69%	96.59%	133.20%	2.03	4.48%	19.52%	-23.41%	8.08
16	2015	4.74%	93.94%	125.78%	1.93	2.23%	20.51%	-31.28%	8.13
17	2003	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00

MFI Code	Year	ROA	FSS	OSS	DER	PaR	OER	LLR	Log Asset (Size)
17	2004	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
17	2005	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
17	2006	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
17	2007	-17.00%	47.00%	99.00%	5.00	17.00%	16.00%	14.00%	7.16
17	2008	-3.00%	42.00%	84.00%	1.30	27.00%	10.00%	0.16%	7.65
17	2009	-1.00%	76.00%	92.00%	1.80	22.00%	9.00%	0.22%	7.80
17	2010	-2.00%	74.00%	79.00%	2.49	38.00%	4.00%	0.24%	7.84
17	2011	-2.50%	80.00%	90.00%	1.79	29.83%	11.99%	0.33%	7.98
17	2012	1.10%	83.00%	154.00%	2.77	37.60%	1.70%	0.33%	8.02
17	2013	9.93%	91.00%	133.86%	1.74	31.57%	43.76%	3.59%	8.06
17	2014	2.04%	49.89%	113.58%	2.01	25.73%	17.73%	0.00%	8.14
17	2015	1.52%	58.97%	110.08%	2.21	26.47%	16.99%	-1.72%	8.18
18	2003	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
18	2004	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
18	2005	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
18	2006	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
18	2007	-14.00%	56.00%	82.00%	0.60		31.00%	17.00%	6.80
18	2008	1.00%	51.00%	108.00%	0.89	2.00%	25.00%	0.11%	6.82
18	2009	3.00%	101.00%	123.00%	1.70	5.00%	17.00%	0.01%	7.01
18	2010	5.00%	127.00%	133.00%	2.29	8.00%	12.00%	0.02%	7.24
18	2011	8.10%	125.00%	155.00%	2.48	9.26%	12.23%	0.02%	7.36
18	2012	8.90%	137.00%	173.00%	2.88	7.50%	9.60%	0.02%	7.66
18	2013	12.10%	153.00%	198.96%	2.79	3.98%	16.07%	0.00%	7.84
18	2014	13.62%	157.94%	234.29%	1.65	2.91%	13.10%	0.00%	8.01
18	2015	16.05%	167.96%	248.29%	1.37	3.03%	13.05%	0.00%	8.18
19	2003	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
19	2004	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
19	2005	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
19	2006	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
19	2007	-6.00%	72.00%	91.00%	2.20	0.90%	21.00%	2.00%	6.91
19	2008	0.00%	40.00%	103.00%	1.95	2.00%	15.00%	0.01%	7.08
19	2009	0.00%	83.00%	101.00%	1.40	3.00%	17.00%	0.03%	7.22
19	2010	1.00%	97.00%	111.00%	1.35	5.00%	7.00%	0.01%	7.26
19	2011	11.60%	151.00%	211.00%	0.93	0.43%	10.15%	0.03%	7.48
19	2012	12.00%	70.00%	104.00%	2.02	3.30%	9.30%	0.02%	7.66
19	2013	4.96%	80.00%	111.99%	2.18	8.36%	53.28%	-1.70%	7.78
19	2014	0.73%	79.43%	104.51%	1.91	4.96%	22.54%	-1.75%	7.80
19	2015	1.51%	52.83%	108.00%	1.59	4.81%	27.34%	-1.78%	7.84
20	2003	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
20	2004	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
20	2005	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00

MFI Code	Year	ROA	FSS	OSS	DER	PaR	OER	LLR	Log Asset (Size)
20	2006	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
20	2007	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
20	2008	-24.00%	4.00%	16.00%	0.65	3.00%	40.00%	0.00%	6.26
20	2009	-12.00%	68.00%	83.00%	0.40	1.00%	25.00%	0.01%	6.61
20	2010	34.00%	44.00%	47.00%	0.38	2.00%	25.00%	0.01%	6.61
20	2011	19.20%	62.00%	98.00%	0.52	2.09%	15.38%	0.02%	6.80
20	2012	8.80%	68.00%	112.00%	1.55	7.70%	10.00%	0.01%	7.08
20	2013	1.68%	71.00%	113.10%	2.07	3.70%	17.37%	0.00%	7.25
20	2014	0.97%	29.48%	129.86%	1.30	5.45%	4.55%	0.00%	7.21
20	2015	-3.39%	26.18%	77.93%	1.07	9.74%	21.99%	0.00%	7.13
21	2003	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
21	2004	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
21	2005	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
21	2006	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
21	2007	-17.00%	62.00%	114.00%	0.20	4.00%	23.00%	9.00%	6.61
21	2008	4.00%	50.00%	137.00%	1.06	3.00%	18.00%	0.01%	6.84
21	2009	19.00%	136.00%	149.00%	1.10	3.00%	3.00%	0.01%	7.07
21	2010	15.00%	141.00%	150.00%	0.60	2.00%	13.00%	0.01%	7.12
21	2011	6.40%	106.00%	140.00%	1.13	2.33%	16.68%	0.02%	7.19
21	2012	18.90%	96.00%	124.00%	0.97	2.00%	19.60%	0.01%	7.25
21	2013	11.29%	97.00%	146.24%	1.71	1.32%	36.29%	0.00%	7.30
21	2014	7.44%	85.90%	150.64%	1.75	1.03%	21.05%	0.00%	7.41
21	2015	7.87%	134.57%	156.23%	1.50	1.29%	20.48%	0.00%	7.45
22	2003	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
22	2004	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
22	2005	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
22	2006	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
22	2007	0.00%	0.00%	0.00%	0.00	0.00%	0.00%	0.00%	0.00
22	2008	-12.91%	17.00%	42.78%	0.13	4.41%	49.03%	0.21%	6.96
22	2009	-3.93%	19.55%	72.27%	0.55	6.06%	30.38%	0.29%	7.17
22	2010	2.24%	22.48%	115.40%	0.75	7.10%	38.93%	0.22%	7.24
22	2011	0.40%	47.00%	112.00%	1.95	8.72%	11.89%	0.33%	7.44
22	2012	1.50%	58.00%	142.00%	2.18	17.40%	6.40%	0.11%	7.57
22	2013	6.14%	67.00%	161.13%	2.78	9.28%	13.86%	0.00%	7.67
22	2014	1.23%	51.45%	143.62%	4.14	8.70%	3.63%	0.00%	7.80
22	2015	2.76%	87.62%	190.55%	4.44	4.52%	4.23%	0.00%	7.89