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The effect of capital structure on microfinance institutions performance

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This Master's Thesis is carried out as a part of the education at the University of Agder and is therefore approved as a part of this education. However, this does not imply that the University answers for the methods that are used or the conclusions that are drawn.

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ABSTRACT

This study attempts to identify the effect of capital structure on overall financial performance of micro finance institutions (MFIs). The study used cross sectional data that contained information from 403 MFIs in 73 countries. Multivariate regression analysis was applied in order to get the results. Cost of funds and return on assets were used as measures for the performance of MFIs, and debt to equity and debt to assets were used as measures for the capital structure, in addition to 10 control variables. The findings of the study indicate that most of the MFIs are highly leveraged, they use approximately four times more debt financing than equity. Further the regression results revealed that total debt to assets and short term debt to assets have a positive and significant effect on cost of funds. Long term debt to assets also has a positive impact on cost of funds, but the relationship was not significant. Total debt to assets and long term debt to assets have a negative and significant effect on return on assets. Short term debt to assets also has a negative effect on return on assets, but the relationship was not significant. There were not detected any significance between the debt to equity ratios and MFIs performance in this study.

ACKNOWLEDGEMENT

First I would like to thank my supervisor, Roy Mersland, for all his help and feedback throughout this thesis.

This thesis completes the final part of my Master in Business Administration, with specialization in Financial Economics at the University of Agder. The aim of the thesis is to learn how to apply scientific methods in an applied problem.

It has been very challenging to work with this thesis, but I have also learned very much in the process. I chose the topic "microfinance" because this is a highly relevant and very interesting topic. The most challenging task was to select the right variables for the analysis, and to carry out the statistical analysis.

A special appreciation goes to my husband Svein for all his love and support.

Camilla Janner Lislevand

Kristiansand 03 December 2012

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LIST OF ABBREVIATIONS

MFIs	Microfinance institutions
NGOs	Nongovernmental organizations
ROA	Return on assets
ROE	Return on equity
SMEs	Small and medium sized enterprises
OLS	Ordinary Least Squares
VIF	Variance inflating factor
COF	Cost of funds
DE	Debt to Equity
LDE	Long term Debt to Equity
SDE	Short term Debt to Equity
DA	Debt to Assets
LDA	Long term Debt to Assets
SDA	Short term Debt to Assets
PaR	Portfolio at Risk
SA	Savings to Assets
EECA	Eastern Europe or Central Asia
MENA	Middle East or North Africa
LA	Latin America

1. INTRODUCTION

1.1 Motivation

Microfinance has been a hot topic in the media over the last years, and is not without disadvantages, but there are also many who benefits from it and are able to get a better life because of it. Financing is a scarce factor for many poor people around the world who wish to improve their livelihood. In order for microfinance institutions (MFIs) to be able to help these people gain access to financial sources they need to be able to cover their costs and earn profits. It is hard for MFIs to achieve their goals if they are not performing well financially. Capital structure decisions are an important factor for firm's performance. I will therefore focus on the effect of capital structure on MFIs performance in this study.

1.2 Objective of the study

The title of this thesis *is "The effect of capital structure on microfinance institutions performance"*, and the main objective is to identify how capital structure affects the financial performance of MFIs, focusing on cost of funds and return on assets as measures of capital structure. In order to do this I will present elements that might have an effect on the overall performance and then I will study how they actually are affecting the performance of MFIs.

In order to do this I have studied several variables regarding capital structure and performance, some of them have barely been tested before. I have used a large global dataset that contains information from 403 MFIs in 73 countries (Mersland, 2011).

1.2 Structure

This thesis is made up by six chapters, including the introduction chapter (chapter one).

Chapter two gives an overview of the microfinance industry, it also includes different microfinance concepts, participants, products and services, performance of MFIs and performance indicators.

Chapter three presents the theoretical framework of the study, which is different capital structure theories and empirical literature. The chapter also includes hypothesis and variables that are used in this study.

Chapter four presents the data and research methodology that was used in this study, it also presents the econometric models that were used in the regression models.

Chapter five presents the regression diagnostics and the descriptive statistics to make the reader get to know the data, it also presents data analysis and the findings of the regression models that were performed to analyze the relationship between capital structure and MFIs performance.

Chapter six summarizes the findings and presents a conclusion of the analysis. Recommendations for new research are also given.

2. MICROFINANCE

This chapter gives a brief overview of the microfinance industry and includes different microfinance concepts.

2.1 Introduction

Microfinance refers to giving poor and low income people with no access to financial services through the ordinary formal financial sector the provision of different types of small-scale financial services. The fundamental services that the MFIs provide are the same that conventional financial institutions offer to their clients, the only difference is the scale and method of service delivery (Ledgerwood, 1999).

Here is a definition of microfinance used by Gateway (2012) that I will use throughout this thesis: "*Microfinance is often defined as financial services for poor and low-income clients offered by different types of service provider"* (Gateway, 2012). Some MFIs also provide enterprise development services, such as skills training and social services, these are not included in this definition, and it only focuses on the financial side of microfinance, which I also will do in this thesis.

There have been a huge growth in the microfinance industry for over a decade, but there is still a long way to go, it only reaches a small percentage of its potential market worldwide (Ledgerwood & White, 2006). Microfinance can be a powerful instrument against poverty, but it is only when supply meets demand that the poor people can find their way out of poverty(Helms, 2006). According to the most recent estimates microfinance has reached one hundred and fifty million individuals worldwide (Armendariz & Labie, 2011). Still 90 percent of the population of the developing world do not have access to formal sector financial services (Robinson, 2001).

Helms (2006) points out that there are three major challenges that defines the frontier of financial services for the poor:

1. Scaling up quality financial services to serve large numbers of people (scale)
2. Reaching increasingly poorer and more remote people (depth)
3. Lowering costs to both clients and financial service providers (costs)

Up until now microfinance has been very dependent on international donor funding (Helms, 2006).

According to Fazle Hasan Abed *"The poor remain poor because they are powerless. Once empowered , the poor are able to chance their lives and overcome seemingly impossible odds"* (CGAP, 2006, p. vii).

There is a huge demand for small scale commercial financial services among the world's poor and low income people. The financial services can help them improve household and enterprise management, increase productivity, smooth income flows and consumption costs, enlarge and diversify their micro-businesses, increase their incomes, and empower their way out of poverty. But unfortunately the formal financial sector is rarely able to cover the demand for these financial services (Robinson, 2001). Credit is often widely available from informal commercial moneylenders, such as commercial moneylenders, pawnbrokers and rotating savings, and credit associations but typically at a very high cost to the client (Ledgerwood, 1999; Robinson, 2001). The nominal monthly effective interest rate can range from about 10 percent to more than 100 percent, which is many times the monthly effective rates of sustainable financial institutions, this rate are usually 2-5 percent (Robinson, 2001).

2.2 Clients

The clients of microfinance are typically self-employed, low-income entrepreneurs from both rural and urban areas. As mentioned in the definition above from Gateway microfinance is provided to poor and low-income clients, but even though they are poor they are generally not considered to be among the "poorest of the poor"(Ledgerwood, 1999). Microfinance is often provided to clients who are traders, street vendors, small farmers, service providers, craftsmen, small producers and to other individuals or groups at the local levels of developing countries (Ledgerwood, 1999; Robinson, 2001). The majority of the clients are women, only 33 percent of all microfinance clients are men (CGAP, 2012).

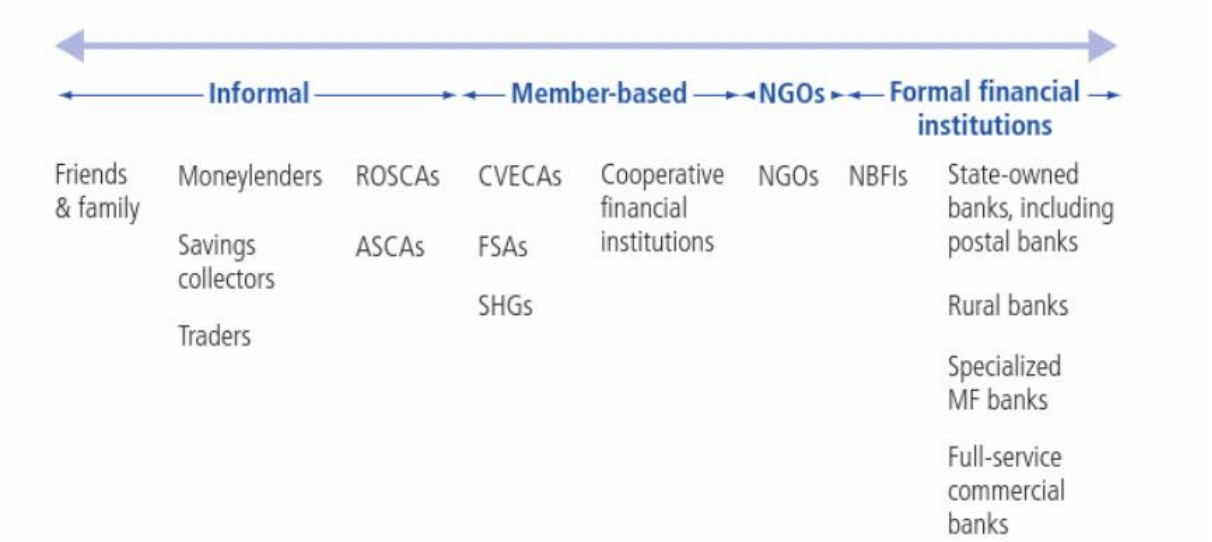
All though microfinance can be a powerful instrument against poverty is not always the answer. For people who are extremely poor and badly malnourished, ill, and without skills or employment opportunities there might be other kind of support that may work better (Helms, 2006; Robinson, 2001). Such people need food, shelter, medicines, skill training, and

employment, and when they are ready to work microfinance might be the next step (Robinson, 2001).

2.3 Providers

There are many different types of microfinance providers, they can be ranged from informal to formal (Ledgerwood, 1999). The level of formality depends on the sophistication of the organizational structure and governance, but it also depends on the degree of oversight or supervision by governments. (Helms, 2006). In table 2-1 you can see an overview of the different providers of microfinance.

Figure 2-1 The spectrum of microfinance providers



Note: ROSCAs = rotating savings and credit associations; ASCAs = accumulating savings and credit associations; CVECAs = Caisses Villageoises d'Èpargne et de Crédit Autogérées; FSAs = financial service associations; SHGs = self-help groups; NGOs = nongovernmental organizations; NBFI = nonbank financial institution

Source: (Helms, 2006, p. 36)

The most common way for poor people to access financial services are through the informal sector. Informal providers have a more simple organizational structure than the formal ones, and they are not supervised by the government. These providers consist of friends and family, moneylenders, pawnbrokers, community savings clubs, deposit collectors, and agricultural input providers, traders, and processors. Member based organizations like CVECAs, FSAs,

AHGs and cooperative financial institutions are often organized in a more formal way, and they typically rely on their members own savings as the main source of funds (Helms, 2006).

NGOs are in between the informal and the formal financial institutions. They have been pioneers in the development of microfinance, and are often associated with a more social mission. But in the past ten years they have moved in a more commercial direction, and pushing the poverty frontier. Many of the NGOS are also donor dependent and high cost operational, because it is harder to become sustainable when working with the poorest and more remote clients (Helms, 2006).

Formal financial institutions are chartered by the government and are also subject to banking regulations and supervision (Ledgerwood, 1999). These providers consists of NBFIs, state-owned banks and postal banks, rural banks, specialized MFI banks and full-service commercial banks. These institutions have an unfortunate history in the microfinance sector for their unwillingness to serve the poor. But they also have an enormous potential for making financial systems truly inclusive. Their strengths are broad range of services, own capital, wide branch networks and the funds to invest in banking systems and skills (Helms, 2006).

On average the clients of banks are less poor than the ones of NGOs. But banks do have much wider outreach and they are also more efficient. Therefore, according to Armendariz & Morduch (2010), these differences implies that there is a need for balance, where commercial lenders and nonprofit institutions can coexist and work in separate niches (Armendariz & Morduch, 2010). As mentioned before the informal institutions are an important source for financial services, but in this thesis I will mainly be focusing on the formal ones and some NGOs, because these are registered.

2.4 Products and Services

There are a variety of products and services that MFIs can offer to their clients, these are mainly financial services. In addition, some MFIs provide nonfinancial services. Here is a brief description of the most common products that MFIs offer their clients:

Credit service

The MFIs lend out credit to people that normally do not have access to it from the formal financial market. Loans are mainly made for productive purposes, but also for consumption,

housing and other purposes. MFIs have in general three ways of lending out credit, which is to individuals, groups or village banks. Individual loans are provided to individuals that can guarantee that they are able to repay and have some level of security. By combining methods for lending decisions from formal and informal financial institutions MFIs have successfully developed effective models for individual lending. Another lending methodology is group lending, which consists of groups of people who have a common wish to access financial services. Finally we have the "Village Banking model", where MIFs uses larger groups of between 30 to 100 members, and lend out credit to the group itself rather than to individuals (Ledgerwood, 1999).

Poor people are not able to provide collateral, and this is primarily the reason why they are excluded from the formal credit sources (Helms, 2006). Information asymmetry is a major problem for the MIFs when providing services to the clients. MFIs are therefore subject to adverse selection, this occurs when they are unable to determine which costumers are likely to be more risky. They also have the problem of moral hazard, which is the case when MFIs are unable to ensure that the clients are putting in enough effort to make their investment projects successful, or if the clients try to abscond with the MFIs money (Armendariz & Morduch, 2010).

Saving service

MFIs are also providing micro-saving to enable poor and low-income people to store their money safe and give them the possibility to earn a return on savings (Ledgerwood, 1999). Savings can help households to build up assets to use as collateral, it can also help them better smooth seasonal consumption needs, finance major expenditures and self-insure against major shocks. We can distinguish between two types of savings, compulsory savings and voluntary savings. Compulsory savings can be considered as part of a loan product rather than an actual savings product, it works as a collateral for the loan received. There has been some criticism to compulsory savings because many of the savings accounts came with so many strings attached that they hardly looked like savings accounts (Armendariz & Morduch, 2010). The other kind of saving type is voluntary savings. This is not an obligatory part of accessing credit services, and is provided by the MIFs to borrowers and non-borrowers. Voluntary savings is a lot easier to use than compulsory savings, but it is still not optimal (Ledgerwood, 1999).

Insurance service

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

Credit cards and payment service

Some MFIs are beginning to offer services like credit cards and payment services, but it is still in an early phase, and not very widespread. Credit cards allow poor and low-income people to access credit when they need it, and have advantages such as streamline operations and an ongoing line of credit to borrowers, enabling them to supplement their cash flow according to their needs. They can also minimize administrative and operative costs for the MIFs. The use of credit cards is still very new, and can only be used when the adequate infrastructure is in place. Payment services include check cashing and check writing privileges, it also include the transfer and remittance of funds from one area to another (Ledgerwood, 1999).

Social service

Some MFIs also provide social service, or nonfinancial service, such as social intermediation and enterprise development to improve the well-being of their clients. They also include health, nutrition, education and literacy training. Most MFIs offer social intermediation to some extent depending on their objectives. It has been shown that it is easier to establish sustainable financial intermediation systems with the poor in societies with high levels of social capital. But providing financial and social services are two separate activities which may have conflicting objectives. It is for example rare for nonfinancial services to be financial sustainable. Another problem is that it might be difficult to identify and control the costs per service, which makes it difficult to measure the self-sufficiency of the financial services (Ledgerwood, 1999)

2.5 Performance of MFIs

MFIs are facing a double challenge: they have to provide both financial services to the poor (outreach) and also cover their costs in order to avoid bankruptcy (sustainability). Hence to assess MFIs performance both dimensions must be taken into account. But as Blankenhol points out it is not always easy to measure the social aspect of microfinance:

"There are no widely accepted measure for assessing the social performance of MFIs, outreach always being defined in terms of several indicators, like percentages of female and rural clients or the average loan size"(Balkenhol, 2007, p. 153).

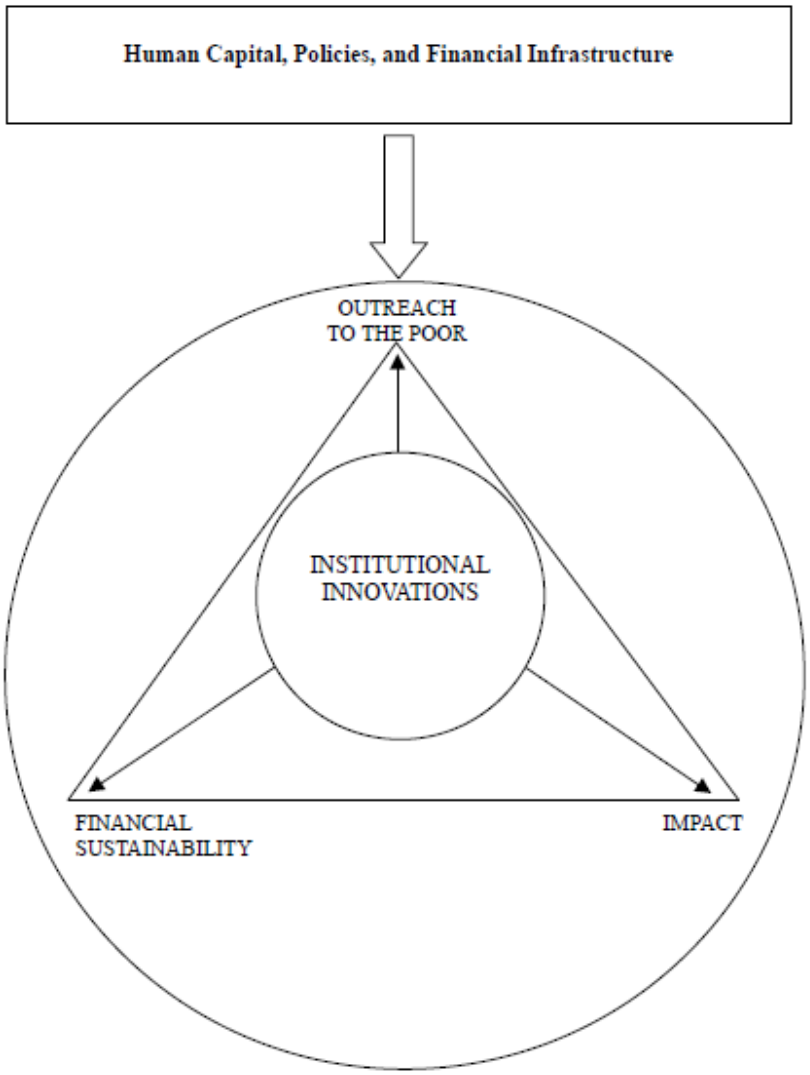
There are several arguments for evaluating and measuring the performance of MFIs.

"Microfinance works best when it measures-and discloses-its performance. Reporting not only helps stakeholders judge costs and benefits, but it also improves performance. MFI needs to produce accurate and comparable reporting on financial performance as well as social performance" (Helms, 2006, p. xii).

Meyer (2002) uses "The Critical Microfinance Triangle" to evaluate the performance of MFIs. This triangle is portrayed in Figure 2-2, there are three general policy objectives: outreach to the poor, financial sustainability, and welfare impact. There are required performance criteria for each objective and all three must be measured to thoroughly evaluate microfinance performance. Meyer (2002) further explains Figure 2-2 like this:

"The inner circle in the Figure 2-2 represents MFI innovations in technology, policies, organization, and management that affect how well each objective is met. The outer circle represents the environment within which microfinance operates that also affects performance. This environment broadly includes the human and social capital possessed by the poor, the economic policies of the country, and the quality of the financial infrastructure that supports financial transactions. Improvements in the environment make it easier for MFIs to reach the three objectives" (Meyer, 2002, p. 2).

Figure 2-2 The Critical Microfinance Triangle



Source: (Meyer, 2002, p. 3)

Outreach to the poor

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

1. *The number of persons now served*, which previously were denied access to formal financial services. These persons will usually be the poor because they cannot provide the collateral required for accessing formal loans, they are perceived as being too risky to serve, and impose high transaction costs on financial institutions because of small size of their financial activities and transactions (Meyer, 2002).

2. *The number of women served*: Women often face greater problems than men in accessing financial services (Meyer, 2002).
3. *The depth of outreach* is important because the poorest of the poor face the greatest access problems. So to evaluate how well the MFIs reach the very poor some measure of depth of outreach is needed (Meyer, 2002).
4. *The variety of financial services:* it has been shown that the poor demand and their welfare will be improved if efficient and secure savings, insurance, remittance transfer and other services are provided in addition to the loans that are the predominant concern of policy makers (Meyer, 2002).

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

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

(Navajas et al., 2000)

Financial sustainability

Financial sustainability is another aspect when evaluating performance. Meyer (2002) states that;

"The financial sustainability of MFIs is important as the poor benefit most if they have access to financial services over time rather than receive just one future loan but denied future loans because the MFI has disappeared" (Meyer, 2002, p. 4).

According to Meyer (2002) there are two levels of financial sustainability that can be measured; operational self-sustainability and financial self-sustainability. Operational self-sustainability means that operating income is sufficient to cover operating costs. Financial

self-sustainability means that the MFI also can cover the costs of funds and other forms of subsidies received when valued at market rates (Meyer, 2002).

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

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

Impact

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

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

Economic benefits:

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

Noneconomic benefits:

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

(Meyer, 2002)

2.6 Performance indicators

In this section I will discuss some of the most common indicators used to measure MFIs performance. According to the Technical Guide of Performance Indicators for Microfinance Institutions (2003) there are four main categories of performance indicators: portfolio quality, efficiency and productivity, financial management and profitability (MicroRate & InterAmericanDevelopmentBank, 2003)

Portfolio quality

"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" (MicroRate & InterAmericanDevelopmentBank, 2003, p. 2).

Portfolio quality for MFIs are often measured by Portfolio at Risk (PaR), which measures the portion of the loan portfolio "contaminated" by arrears as a percentage of the total portfolio. A loan is considered to be at risk if the payment on it is more than 30 days late. In addition to Portfolio at Risk, we can also use Write-Offs, Provision Expenses and Risk Coverage as portfolio quality indicators (MicroRate & InterAmericanDevelopmentBank, 2003).

Efficiency and productivity

"Efficiency and productivity indicators are performance measures that show how well the institution is streamlining its operations. Productivity indicators reflect the amount of output

per unit of input, while efficiency indicators also take into account the cost of the inputs and/or the price of outputs" (MicroRate & InterAmericanDevelopmentBank, 2003, p. 2).

To measure efficiency and productivity we can use Operating Expenses, Cost per Borrower, Personnel Productivity and Loan Officer Productivity as indicators (MicroRate & InterAmericanDevelopmentBank, 2003).

Financial Management

"Financial management assures that there is enough liquidity to meet an MFI's obligations to disburse loans to its borrowers and to repay loans to its creditors. Even though financial management is a back office function, decisions in this area can directly affect the bottom line of the institution" (MicroRate & InterAmericanDevelopmentBank, 2003, p. 2).

To measure the financial management of a MFI we can use Funding Expence, Cost of Funds and the Debt/Equity ratio as indicators (MicroRate & InterAmericanDevelopmentBank, 2003).

Profitability

"Profitability measures, such as return on equity and return on assets, tend to summarize performance in all areas of the company. If portfolio quality is poor or efficiency is low, this will be reflected in profitability" (MicroRate & InterAmericanDevelopmentBank, 2003, p. 3).

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

To measure the profitability of a MFI we can use Return on Equity, Return on Assets and Portfolio Yield as indicators (MicroRate & InterAmericanDevelopmentBank, 2003).

2.7 Why measure performance?

Performance measurements can be used for many different purposes. MFIs performance is measured for internal and external purposes. According to CGAP microfinance works best when it measures and discloses its performance. Reporting is not just helpful for stakeholders to judge costs and benefits, but it can also improve the performance (CGAP, 2006). In order

to get better at something we have to measure it, and one of the main reasons for measuring performance is to improve it.

According to Simons (2000) business performance measurement is a tool to balance five major tensions within a firm:

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

(Simons, 2000)

3. CAPITAL STRUCTURE THEORIES AND HYPOTHESIS

This chapter presents the theoretical framework applied for the study, it includes a review of capital structure theory and also a discussion about the effect of capital structure on MFIs performance. This chapter also includes hypothesis and variables.

3.1 Capital structure theory

The capital structure decision is crucial for any business organization, including MFIs. This decision is important because of the need to maximize the returns off the firm, and also because of the impact such a decision has on the firm's ability to deal with its competitive environment. The capital structure of a firm is a mix of different securities (Abor, 2005). Berk and DeMarzo (2007) defines capital structure like this: *"The relative proportions of debt, equity, and other securities that a firm has outstanding constitute its capital structure"* (Berk & DeMarzo, 2007, p. 428).

Today MFIs have an increasingly broad range of financial sources at their disposal. This gives them a wider funding diversification, but it also makes it much more complex to make decisions about capital structure. Better capital structure decision making amongst MFIs will minimize risk, maximize financial flexibility, and encourage the long-term solvency needed to provide sustainable financial services to poor clients (CGAP, 2007).

Within finance capital structure has been a hotly debated issue for years. Several theories have been advanced in explaining the firm's capital structure. Despite this researchers in financial management have not yet found the optimal capital structure. So far the best that the academics and practitioners have been able to achieve are prescriptions that satisfy short-term goals (Abor, 2005). The following section gives a review of the literature on the subject.

3.1.1Modigliani and Miller Theorem

One of the earliest important papers on capital structure is the work of Modigliani and Miller. In 1958 they published a seminal work in capital structure where they concluded to the broadly known theory of "capital structure irrelevance" where the capital structure is irrelevant to the value of a firm in perfect capital markets (Abor, 2005; Miller & Modigliani, 1958). The law of one price implied that leverage would not affect the total value of the firm. Instead, it only changes the allocation of cash flows between debt and equity, without changing the total cash flows of the firm (Berk & DeMarzo, 2007).

The Modigliani and Miller theorem holds under the assumption of a perfect capital market, which means:

- Individuals and firms trade at the same rates (homogenous expectations)
- No taxes exists
- No transaction costs exists

(Berk & DeMarzo, 2007; Kyereboah-Coleman, 2007)

Modigliani and Miller proposition I: *In a perfect capital market, the total value of a firm is equal to the market value of the total cash flows generated by its assets and is not affected by its choice of capital structure* (Berk & DeMarzo, 2007, p. 432).

Modigliani and Miller proposition II: *The cost of capital of levered equity is equal to the cost of capital of unlevered equity plus a premium that is proportional to the market value debt-equity ratio* (Berk & DeMarzo, 2007, p. 438).

This theorem has also been supported by others, such as (Hamada, 1969), and (Stiglitz, 1974). Modigliani and Miller propositions are also the foundations of capital structure today, however their theory is based on very restrictive assumptions that does not hold in the real world (Abor, 2005; Kyereboah-Coleman, 2007). Because of this there has according to Kyereboah-Coleman (2007) been several studies that has rejected the assertion made by Modigliani and Miller, such as (M. C. Jensen & Meckling, 1976), (Myers, 1977), (Williams, 1987), (Harris & Raviv, 1990), (Grossman & Hart, 1982), and (M. C. Jensen, 1986).

3.1.2 The tradeoff theory

The tradeoff theory says that the firm will borrow up to the point where the marginal value of tax shields on additional debt is just offset by the increase in the present value of possible cost of financial distress. The value of the firm will decrease because of financial distress (Myers, 2001). According to Myres (2001) financial distress refers to*: " the costs of bankruptcy or reorganization, and also to the agency costs that arise when the firm's creditworthiness is in doubt"* (Myers, 2001, p. 89). The tradeoff theory weights the benefits of debt that result from shielding cash flows from taxes against the costs of financial distress associated with leverage.

"According to this theory, the total value of a levered firm equals the value of the firm without leverage plus the present value of the tax savings from debt, less the present value of financial distress costs":

$V^L = V^U$ + PV (Interest Tax Shield) – PV (Financial Distress Costs)

Source: (Berk & DeMarzo, 2007, p. 501)

This equation shows that leverage has cost as well as benefits.

3.1.3 The pecking order theory

The pecking order theory put forth by (Myres, 1984) presents the idea that firms will initially rely on internally generated funds, i.e. undistributed earnings, where there is no existence of information asymmetry, then they will turn to debt if additional funds are needed and finally they will issue equity, only as a last resort, to cover any remaining capital requirements. The order of preferences reflects the relative costs of the various financing options (Abor, 2005; Berk & DeMarzo, 2007).

Myres (2001) lists up four points to explain the pecking order theory of capital structure:

1. Firms prefer internal to external finance
2. Dividends are "sticky"
3. If external funds are required for capital investment, firms will issue the safest security first, that is, debt before equity.
4. Each firm's debt ratio reflects its cumulative requirement for external financing

Source: (Myers, 2001, pp. 92-93)

"The pecking order theory explains why the bulk of external financing comes from debt. It also explains why more profitable firms borrow less: not because their target debt ratio is low-in the pecking order they don't have a target-but because profitable firms have more internal financing available. Less profitable firms require external financing, and consequently accumulate debt" (Myers, 2001, p. 93).

3.1.4 The agency cost theory

Jensen and Meckling (1976) argued that it is inevitable to avoid agency costs in corporate finance. Agency costs are the costs that arise when there are conflicts of interest between

stakeholders and managers and between debt-holders and shareholders (Berk & DeMarzo, 2007; M. C. Jensen & Meckling, 1976).

Jensen and Meckling (1976) describe and agency relationship as:

" a contract under which one or more persons (the principal(s)) engage another person (agent) to perform some service on their behalf which involves delegating some decision making authority to the agent" (M. C. Jensen & Meckling, 1976, p. 5).

The principals have two main problems; adverse selection, because they are faced with selecting the most capable managers, and the problem of moral hazard, because they must give the agents (managers) the right incentives to make decisions aligned with shareholder interests (Kyereboah-Coleman, 2007).

Managers (agents) will generally make decisions that increase the value of the firm's equity, because top managers often hold shares in the firm and are hired and retained with the approval of the board of directors, which itself is elected by stakeholders (principals). When a firm has leverage, a conflict of interest will arise if investment decisions will have different consequences for the value of equity and the value of debt. This kind of conflict is most likely to occur when the risk of financial distress is high. In some circumstances, managers may take some actions that can benefit shareholders but harm the firm's creditors and also lower the total value of the firm (Berk & DeMarzo, 2007).

Jensen and Meckling (1976) defines agency costs as the sum of:

- The monitoring expenditures by the principal, such as auditing, budgeting, control and compensation systems
- The bonding expenditures by the agent
- The residual loss, due to divergence of interest between the principal and the agent

The share price that shareholders pay reflects such agency costs. So to increase firm value, the agency costs must be reduced (M. C. Jensen & Meckling, 1976; Kyereboah-Coleman, 2007).

In their paper Jensen and Meckling (1976) states that the existence of agency costs provide strong reasons for arguing that the probability distribution of future cash flows is dependent of the capital structure. They also argue that an optimal capital structure can be obtained by trading off the agency cost of debt against the benefit of debt (M. C. Jensen & Meckling, 1976).

As stated above there does not exist any universal theory of capital structure, however there are several useful conditional theories, and some of these has been presented above (Myers, 2001). But, does the capital structure influence the performance of a firm? Kyereboah-Coleman (2007) argues that this relationship exists:

"The capital structure of a firm is basically a mix of debt and equity which a firm deems as appropriate to enhance its operations. Thus, theory point out that high leverage or low equity/asset ratio reduces agency cost of outside equity and thus increases firm value by compelling managers to act more in the interest of shareholders, (Berger & Bonaccorsi-diPatti, 2006). Therefore capital structure is deemed to have an impact on a firm performance against the position held by Modogliani and Miller in their seminal work of 1958"
(Kyereboah-Coleman, 2007, p. 56).

This thesis focuses on examine the effect of capital structure on MFIs performance.

3.2 Empirical literature

There have been several studies investigating the determinants of capital structure of firms in different business sectors such as electricity and utility companies (Miller & Modigliani, 1966), manufacturing sector (Long & Malitz, 1985; Titman & Wessels, 1988), non-profit hospitals (Wedig, Sloan, Hassan, & Morrisey, 1988), agricultural firms (Jensen & Langemeier, 1996) and joint venture-ships (Boateng, 2004). One of the main findings in the studies listed above is that industrial or sector classification is an important determinant of capital structure, because different sectors employ different mix of debt and equity for their operations (Kyereboah-Coleman, 2007).

There have also been studies emphasizing on the relationship between capital structure and firm performance. Berger and Bonaccorsi di Patti (2006) argued that firm performance and capital structure could be closely correlated. They used data on commercial banks in the US and their results are consistent with the agency theory, under which high leverage reduces the agency costs of outside equity and increases firm value by constraining or encouraging managers to act more in the interests of shareholders (Berger & Bonaccorsi-diPatti, 2006). Abor (2005) on "The effect of capital structure on profitability: an empirical analysis of listed firms in Ghana", show a significantly positive relation between the short-term debt ratio and profitability (measured by ROE). However, a negative relationship between long-term debt ratio and profitability was established. But in terms of the relationship between total debt ratio and profitability, the results of his study indicated a significantly positive association between

total debt ratio and profitability (Abor, 2005). There have also been a number of other studies providing empirical evidence supporting this positive relationship between debt level and firm's performance (Champion, 1999; Gill, Biger, & Mathur, 2011; Hadlock & James, 2002; Hutchinson, 1995; Roden & Lewellen, 1995; Taub, 1975).
Abor (2007) on "Debt policy and performance of SMEs: evidence from Ghanaian and South African firms", show that capital structure, especially long term and total debt ratios, negatively affect performance of SMEs (Abor, 2007). There have also been some other studies that have provided empirical evidence supporting this negative relationship between debt level and firm's performance (Cassar & Holmes, 2003; Fama & French, 1998; Gleason, Mathur, & Mathur, 2000; Majumdar & Chhibber, 1999; Titman & Wessels, 1988).

Studies emphasizing on linkage between capital structure and performance in MFIs have been few. Kyereboah-Coleman (2007) on "The impact of capital structure on the performance of microfinance institutions" found that most of the MFIs use high leverage and finance their operations with long term as against short term debt. Further the study show that highly leveraged MFIs perform better by reaching out to more clientele, enjoy scale economies, and are therefore better able to deal with moral hazard and adverse selection. The study uses panel data covering a ten year period, 1995-2004, and consists of 52 MFIs from Ghana. ROA and ROE is used as performance indicators, and total debt, short term debt and long term debt are used as indicators for capital structure of MFI. As control variables size, age and risk level are used (Kyereboah-Coleman, 2007).

Silva (2008) on "The effect of capital structure on MFIs performance" is consistent with the previous study by Kyereboah-Coleman (2007). This study found that total debt and short term debt ratio impacts positively and significantly on ROE while negatively and significantly on ROA. Long term debt ratio had a positively and significantly impact ROE but not significantly impact on ROA of MFIs. This shows that if MFIs use long term debt to finance their operations, there may not be a pressure on management of MFI. This further suggests that profitable MFIs depend more on long term debt financing. The study uses a data set which consists of 290 MFIs from 61 countries. ROA and ROE is used as performance indicators, while debt to equity, long term debt to equity, short term debt to equity, debt to assets, long term debt to assets and short term debt to assets ratios are used as indicators of capital structure of MFIs. There are also used some control variables in the study (Silva,

2008). Silva (2008) used exactly the same research problem as in this study, he has also used the same dataset, but in this study the dataset contains more variables.

Kar (2012) seeks to answer the question "Does capital and financing structure have any relevance to the performance of microfinance institutions?" from an agency theoretic standpoint. The results of the study confirm the agency theoretic claim that an increase in leverage raises profit-efficiency. It also finds that cost efficiency decreases with decreasing leverage. Leverage have a negative significant impact on debt of outreach, but the study finds that capital structure does not have any noticeable impact on breadth of outreach. The study uses a panel dataset of 782 MFIs in 92 countries for the period 2000–2007. ROA, ROE and operating expenses per dollar lent (OELP) are used as indicators for financial performance and some of the indicators for capital structure are capital-asset ratio, debt-equity ratio, loans-asset ratio and PAR30.

3.3 Hypothesis and variable presentation

In this section I will give present the variables that are used in the study and I will also present the hypothesis which be tested later in this thesis.

3.3.1 Dependent variables

In this study I employ cost of funds and Return on Assets (ROA) as the two dependent variables, and as measures of financial performance of MFIs. Even though there does not exists a unique measurement of financial performance in the literature, cost of funds was chosen because it is an important factor of banks and therefore also MFIs performance. ROA was also chosen because it is a widely accepted measurement of financial performance.

Cost of funds

The cost of funds ratio measures the average cost of the MFIs borrowed funds.
This is one of the most important input costs for a financial institution, because a lower cost will generate better returns when the funds are deployed in the form of short-term and long-term loans to borrowers. The spread between the cost of funds and the interest rate charged to their borrowers represents one of the main sources of profit for most financial institutions. (Investopedia, 2012). When comparing MFIs, cost of funds ratio shows weather they have gained access to low cost funding sources or not, such as savings. MFIs that can mobilize

savings often have a relatively low cost of funds, but this advantage is to some extent offset by higher administrative costs of mobilizing savings (MicroRate & InterAmericanDevelopmentBank, 2003). Cost of funds are calculated using the following formula (Mersland, 2011):

$$COF = \frac{\text{Interests and fees paid on loans excluded payments on savings}}{\text{Average outstanding loans from creditors}}$$

There have still not been many studies using cost of funds as a measure of financial performance. But according to the technical guide "Performance Indicators for Microfinance Institutions" (2003) cost of funds are used as a measure of MFIs financial management, which further is an indicator of performance. (MicroRate & InterAmericanDevelopmentBank, 2003).

Return on Assets (ROA)

ROA measures how well the institution uses all its assets. It is also an overall measure of profitability which reflects both the profit margin and the efficiency of the institutions. ROA is calculated using the following formula:

$$ROA = \frac{\text{Net income}}{\text{Average assets}}$$

According to the technical guide "Performance Indicators for Microfinance Institutions" (2003) ROA are used as a measure of MFIs profitability, which further is an indicator of performance. (MicroRate & InterAmericanDevelopmentBank, 2003). ROA is a widely accepted measure of financial performance, and is used in several studies.

"In banks and other commercial institutions, the most common measure of profitability is return on assets (ROA), which reflects that organization's ability to deploy its assets profitably" (Rosenborg, 2009, p. 8).

Kyereboah-Coleman (2007) on "The impact of capital structure on performance of microfinance institutions, Silva (2008) on "The effect of capital structure on MFIs performance", and Kar (2012) on "Does capital and financing structure have any relevance to the performance of microfinance institutions?" all uses ROA as an indicator of financial performance in their studies. Other studies by Abor (2007) on "Debt policy and performance

of SMEs: evidence from Ghanaian and South African firms" and Narendar *et all* (2007) on "Capital structure and financial performance: evidence from Oman" also uses ROA as dependent variable (Rao, Al-Yahyaee, & Syed, 2007).

As stated above, according to theory and empirical studies both cost of funds and ROA are used to explain the effect that capital structure has on firm performance. Hence cost of funds and ROA measures the financial performance of the firm. There are a number of factors that may have an impact on performance (cost of funds and ROA), to show this a number of explanatory variables (Debt to equity ratios and Debt to asset ratios) and control variables (age of the firm, size of the firm, portfolio at risk, savings to assets, type of ownership and regional variables) where chosen.

3.3.2 Explanatory variables

The explanatory (independent) variables in this study are the short and long term debt to equity ratio and debt to asset ratio. These serve as a proxy for capital structure.

Debt to equity ratio

The debt to equity ratio is a common measure used to assess a firm's leverage, or in other words the extent to which it relies on debt as a source of financing (Berk & DeMarzo, 2007).

The following hypothesis is proposed:

Hypothesis ii: Debt to equity ratio

Hii_0: Hii_1 is not true

Hii_1: Debt to equity has a positive effect on COF and a negative effect on ROA

Debt to equity ratio is calculated using the following formula:

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

In addition to the debt to equity ratio, long term debt to equity and short term debt to equity are also employed in this study.

Debt to asset ratio

The debt to asset ratio measures the amount of funds borrowed by the firm in relation to its assets. In regards to profitability, if the use of debt is increased it will lead to a higher debt to asset ratio.

The following hypothesis is proposed:

Hypothesis ii: Debt to asset ratio

Hii_0: Hii_1 is not true

Hii_1: Debt to asset has a positive effect on COF and a negative effect on ROA

Debt to asset ratio is calculated using the following formula:

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

In addition to the debt to asset ratio, long term debt to asset and short term debt to asset are also employed in this study.

3.3.3 Control variables

There are a number of factors additional to the capital structure that may have an impact on MFIs performance, this is why control variables are included in the model. The following control variables are used; age of the firm, size of the firm, portfolio at risk, savings to assets, type of ownership and regional variables.

Age

The age of the firm might also have an impact on the firm's performance. According to (CGAP, 2009) age have three important effects on MFIs; higher number of loans may drive scale economics, higher average loan sizes may improve the cost structure and more knowledge about customers may streamline processes.

The following hypothesis is proposed:

Hypothesis ii: MFI age

Hii_0: Hii_1 is not true

Hii_1: MFI age has a positive effect on MFI performance

The age of an MFI is calculated by subtracting the year that the organization started up with microfinance activities from the year of rating:

$$Age = Year_{rated} - Year_{start\text{-}up}$$

Size

Due to economies of scale the size of a firm is considered to be an important determinant of a firm's performance.

"Larger, well known firms have greater access to the long term capital market than smaller unknown firms. Smaller, unknown firms tend to either borrow short term by means of bank loans, or issue stock. This explains why larger companies will lean toward debt financing and smaller firms toward equity financing" (Rao et al., 2007, p. 5).

The following hypothesis is proposed:

Hypothesis ii: MFI size

Hii_0: Hii_1 is not true

Hii_1: MFI size has a positive effect on MFI performance

The size of an MFI is calculated by taking the natural logarithm of total assets**.** The following formula is used:

$$Size = \log(Total\ assets)$$

Portfolio at Risk (PaR 30)

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

The following hypothesis is proposed:

Hypothesis ii: Portfolio at risk

Hii_0: Hii_1 is not true

Hii_1: Portfolio at Risk has a negative effect on MFI performance

Portfolio at Risk can be calculated as follows:

PaR = (Outstanding Balance on Arrears over 30 days + Total Gross Outstanding Refinanced (restructured) Portfolio) / Total Outstanding Gross Portfolio

(CGAP, 2003, p. 6)

Savings to assets

This is a measure of how large proportion of the assets that are financed by savings.

Many MFIs faced liquidity problems during the financial crises, and because of rising financial costs and the fluctuations of exchange rates affects many of the MFIs who rely on external finance, many of the MFIs have started to fund at least part of their lending activity by using local savings (Anonymous, 2010). As stated above MFIs that can mobilize savings often have a relatively low cost of funds, because savings is a source of relatively cheap funds (MicroRate & InterAmericanDevelopmentBank, 2003).

The following hypothesis is proposed:

Hypothesis ii: Savings to assets

Hii_0: Hii_1 is not true

Hii_1: Savings has a positive effect on MFI performance

Savings to assets is calculated as follows:

$$\text{SA} = \frac{\text{Total voluntary savings}}{\text{Total assets}}$$

Type of ownership

I have made up a variable ranging from point 1 to 2, where 1 stands for NGO and 2 for Bank, into two dummy variables. The following definitions are used:

$$\text{NGO} = \begin{cases} 1 \text{ if the MFI is operating as a NGO} \\ 0 \text{ otherwise} \end{cases}$$

$$\text{Bank} = \begin{cases} 1 \text{ if the MFI is operating as a Bank} \\ 0 \text{ otherwise} \end{cases}$$

These variables are included in the study because I want to test if the type of ownership of the MFIs has any effect on performance. NGOs often have more poor clients than banks, which often are considered as a more risky segment of the population (Bogan, 2009). According to MicroRate (2003) NGOs generally achieve a higher ROA than licensed and supervised MFIs. This is explained by the fact that NGOs with low debt to equity ratios and limited possibilities to get funding in financial and capital markets, need to rely heavily on retained earnings to fund future growth.

Regional variables

Regional control variables show which regions the MFIs are operating in. I have included regional control variables in the regression models to see if there are any differences in the

performance between regions. The country variables from the dataset have been converted into five dummy variables sorted by regions, as shown below.

$$\text{EECA} = \begin{cases} 1 \text{ if the MFI is operating in Eastern Europe or Central Asia} \\ 0 \text{ otherwise} \end{cases}$$

$$\text{MENA} = \begin{cases} 1 \text{ if the MFI is operating in Middle East or North Africa} \\ 0 \text{ otherwise} \end{cases}$$

$$\text{Asia} = \begin{cases} 1 \text{ if the MFI is operating in Asia} \\ 0 \text{ otherwise} \end{cases}$$

$$\text{LA} = \begin{cases} 1 \text{ if the MFI is operating in Latin America} \\ 0 \text{ otherwise} \end{cases}$$

The following model will be excluded from the study:

$$\text{Africa} = \begin{cases} 1 \text{ if the MFI is operating in Africa} \\ 0 \text{ otherwise} \end{cases}$$

The dataset contains MFIs from 73 different countries, some are more represented than others. Figure 3-1 shows MFIs sorted by the five regions Eastern Europe or Central Asia, Middle East or North Africa, Latin America, Asia and Africa. Latin America have the largest share of 37,22 percent of the MFIs included in the dataset, followd by Africa with 24,32 percent, Eastern Europe and Central Asia has a share of 18,36 percent, 16,38 percent of the MFIs are from Asia, while the Middle East or North Africa have the smallest share of 3,72 percent of the MFIs.

Figure 3-1: MFI sorted by regions

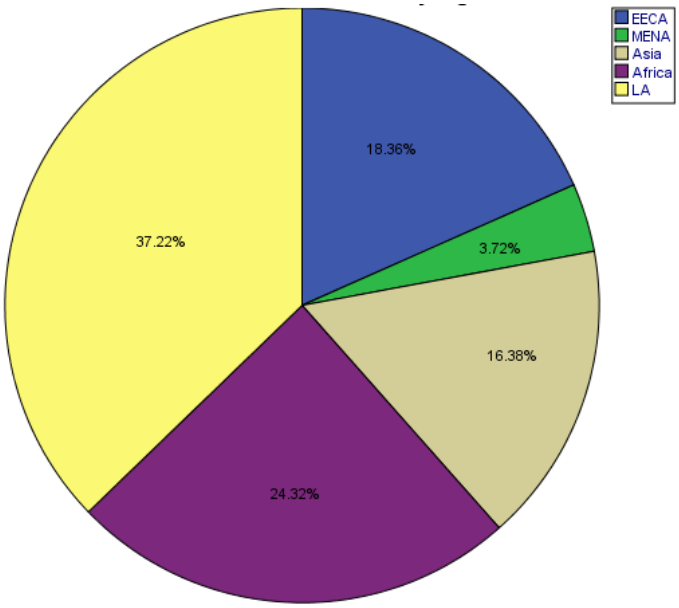


Table 3-1 Summary of all the variables

Variable	Definition	Hypotheses	
		COF	ROA
Dependent variables			
COF (Cost of Funds)	Interest and fees paid on loans excluded payments on savings / Average outstanding loans from creditors		
ROA (Return on Assets)	Net income / Average assets		
Independent variables	(Outstanding Balance on Arrears over 30 days + Total Gross Outstanding Refinanced (restructured) Portfolio) / Total Outstanding Gross Portfolio		
DE (Debt to Equity)	Total debt / Total equity	+	-
LDE (Long Term Debt to Equity)	Long term debt / Total equity	+	-
SDE (Short Term Debt to Assets)	Short term debt / Total equity	+	-
DA (Debt to Assets)	Total debt / Total assets	+	-

LDA (Long Term Debt to Assets)	Long term debt / Total assets	+	-
SDA (Short Term Debt to Assets)	Short term debt / Total assets	+	-
Control variables			
Age	$\text{Year}_{\text{rated}} - \text{Year}_{\text{start-up}}$	+	+
PaR (Portfolio at Risk)	(Outstanding Balance on Arrears over 30 days + Total Gross Outstanding Refinanced (restructured) Portfolio) / Total Outstanding Gross Portfolio	-	-
SA (Saving to Assets)	Total voluntary savings / Total assets	+	+
Size	Log of assets	+	+
Bank	Dummy variable (1,0)		
NGO	Dummy variable (1,0)		
EECA	Dummy variable (1,0)		
MENA	Dummy variable (1,0)		
Asia	Dummy variable (1,0)		
LA	Dummy variable (1,0)		
Africa	Dummy variable (1,0)		

+ when the independent variable increases (decreases) the dependent variable will also increase (decrease)

- when the independent variable decreases (increases) the dependent variable will increase (decrease)

4. DATA AND RESEARCH METHODOLOGY

This chapter presents the research methodology and data analyzing tools used in this study, it also gives a presentation of the data collection method, the sample of the study and the regression models that are used.

4.1 Data collection method

For this thesis I am using secondary data form a dataset compiled by Roy Mersland. It is always important to evaluate the credibility of the data when we are using secondary data (Jacobsen, 2005). The dataset have previously been used in academic research, such as Mersland and Strøm (Mersland & Strøm, 2010), Mersland and Strøm (Mersland & Strøm, 2009), and Beisland and Mersland (Beisland & Mersland, 2012), as well as in several working papers. Therefore I find the reliability of this dataset valid for this thesis.

The dataset contains information from 403 MFIs in 73 countries. The data has been collected form risk assessment reports made by five rating agencies which are officially approved by C-GAP: MicroRate, Microfinanza, Planet Rating, Crisil and M-Cril. The reports range from 10 to more than 40 pages of narrative and accounting information. There have been extracted up to 103 variables from up to eight financial years from the reports. All numbers in the dataset have been annualized and dollarized using official exchange rates at the given time (Mersland, 2011).

The data have a certain sample selection bias, because it only includes data from MFIs who willingly have agreed to expose their accounts for scrutiny and rating. But, amongst the rated MFIs most of the rating categories are represented in the data (Mersland, 2011).

4.2 Sample

I have excluded two MFIs from the study, case number 194 and 198, due to missing data in the dataset. So the total number of MFIs in this study is 403.

In the analysis I used the last year of registered data from each MFI, which was defined as year 0. I also performed a robust check on the regression models. The dataset is called cross-sectional data, because all of the observations are from a single given point in time and represent different individual econometric entities from the same time (Studenmund, 2011).

4.3 Econometric model

In order to identify the effect of capital structure on MFIs performance, multiple regression analyses were applied. Multiple regression is not only a technique, but a whole family of techniques which can be used to explore the relationship between one dependent variable and a number of independent variables (Pallant, 2007).

Regression analysis is explained by Studenmund (2011) as:

"Econometricans use regression analysis to make quantitative estimates of economic relationships that previously have been completely theoretical in nature. Regression is a statistical technique that attempts to "explain" movements in one variable, the dependent variable, as a function of movements in a set of other variables, called the independent (or explanatory) variables, through the quantification of a single equation" (Studenmund, 2011, p. 5).

There will often exist several explanatory variables in a given situation. In a multiple regression we can find the best relationship between the response and the different explanatory variables. The general multivariate regression model with K independent variables can be written as follows (Studenmund, 2011, p. 14):

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots + \beta_k X_{ki} + \varepsilon_i \qquad (i = 1,2,\ldots,n)$$

Where Y_i is the *i*th observation of the dependent variable, $X_{1i},\ldots,X_{ki}$ are the *i*th observation of the independent variables, $\beta_0,\ldots,\beta_k$ are the regression coefficients, ε_i is the *i*th observation of the stochastic error term, and n is the number of observations. Y is an n x 1 vector of observations, X is an n x k+1 vector which contains k explanatory variables for the *i*th firm, β is a +1 x 1 vector of the parameters, and ε is a n x 1 vector of disturbance.

As mentioned above, there exists a whole family of different techniques within multiple regression. In this study I have chosen to use the Ordinary Least Squared (OLS) estimation which is the most widely used. OLS is a regression estimation technique which calculates the $\hat{\beta}s$ so as to minimize the sum of squared residuals (Studenmund, 2011).

In order for the OLS estimators to be the best available, the classical assumptions must be met. Because of this, an important part of the regression analysis is to determine whether these assumptions hold for a particular equation, which I will do later in this study. If not, we have to make some assumptions.

The classical assumptions are as follows (Brooks, 2008, p. 44):

1. The errors have zero mean;
   $\mathrm{E}(\varepsilon_t) = 0$
2. The variance of the errors is constant and finite over all values of *x;*
   $\mathrm{var}(\varepsilon_t) = \sigma^2 < \infty$
3. The errors are linearly independent of one another;
   $\mathrm{cov}(\varepsilon_i, \varepsilon_j) = 0$
4. There is no relationship between the error term and corresponding *x* variate (explanatory variable);
   $\mathrm{cov}(\varepsilon_t, x_t) = 0$
5. The error term ε_t is normally distributed;
   $\varepsilon_t \sim N(0, \sigma^2)$

Assumption no.5 is optional, but it is required to make valid conclusions about the population parameters, meaning the actual β, from the sample parameters $\hat{\beta}$ estimated using a finite amount of data (Brooks, 2008).

The error term $\varepsilon_i = Y_i - E(Y_i|X_i)$, were Y_i is the *i*th observation of the dependent variable and $E(Y_i|X_i)$ is the expected value of Y. The error term is a theoretical concept that cannot be observed, but the residual $e_i = Y_i - \hat{Y}_i$, where Y_i is the *i*th observed value, and $\hat{Y}_i$ is the estimated value of the dependent variable Y_i, is a real world value which is calculated for each observation every we run a regression. We can say that the residual is an estimate of the error term (Studenmund, 2011).

The following models were used to identify the effect of capital structure on MFIs performance. Cost of funds and ROA were used as dependent variables, debt ratios as independent variables, and the variables; age of the firm, size of the firm, portfolio at risk, savings to assets, type of ownership and regional variables, were used as control variables. Because of the problem of multicollinearity the debt to equity ratio and the debt to asset ratio cannot be in the same regression model. Therefore we use different models, and use one as a robust for the other one.

Multicollinearity refers to the relationship between the independent variables, and it appears when the independent variables are highly correlated (r = 0,9 and above) (Pallant, 2007).

The empirical multivariate regression models with six independent variables are stated as follows:

Cost of funds:

$$COF_i = \beta_0 + \beta_1 DE_i + \beta_2 PaR_i + \beta_3 Age_i + \beta_4 SA_i + \beta_5 Size_i + \beta_6 Bank_i + \beta_7 NGO_i + \beta_8 EECA_i + \beta_9 MENA_i + \beta_{10} Asia_i + \beta_{11} LA_i + \varepsilon_i \quad (1)$$

$$COF_i = \beta_0 + \beta_1 LDE_i + \beta_2 PaR_i + \beta_3 Age_i + \beta_4 SA_i + \beta_5 Size_i + \beta_6 Bank_i + \beta_7 NGO_i + \beta_8 EECA_i + \beta_9 MENA_i + \beta_{10} Asia_i + \beta_{11} LA_i + \varepsilon_i \quad (2)$$

$$COF_i = \beta_0 + \beta_1 SDE_i + \beta_2 PaR_i + \beta_3 Age_i + \beta_4 SA_i + \beta_5 Size_i + \beta_6 Bank_i + \beta_7 NGO_i + \beta_8 EECA_i + \beta_9 MENA_i + \beta_{10} Asia_i + \beta_{11} LA_i + \varepsilon_i \quad (3)$$

$$COF_i = \beta_0 + \beta_1 DA_i + \beta_2 PaR_i + \beta_3 Age_i + \beta_4 SA_i + \beta_5 Size_i + \beta_6 Bank_i + \beta_7 NGO_i + \beta_8 EECA_i + \beta_9 MENA_i + \beta_{10} Asia_i + \beta_{11} LA_i + \varepsilon_i \quad (4)$$

$$COF_i = \beta_0 + \beta_1 LDA_i + \beta_2 PaR_i + \beta_3 Age_i + \beta_4 SA_i + \beta_5 Size_i + \beta_6 Bank_i + \beta_7 NGO_i + \beta_8 EECA_i + \beta_9 MENA_i + \beta_{10} Asia_i + \beta_{11} LA_i + \varepsilon_i \quad (5)$$

$$COF_i = \beta_0 + \beta_1 SDA_i + \beta_2 PaR_i + \beta_3 Age_i + \beta_4 SA_i + \beta_5 Size_i + \beta_6 Bank_i + \beta_7 NGO_i + \beta_8 EECA_i + \beta_9 MENA_i + \beta_{10} Asia_i + \beta_{11} LA_i + \varepsilon_i \quad (6)$$

Return on Assets:

$$ROA_i = \beta_0 + \beta_1 DE_i + \beta_2 PaR_i + \beta_3 Age_i + \beta_4 SA_i + \beta_5 Size_i + \beta_6 Bank_i + \beta_7 NGO_i + \beta_8 EECA_i + \beta_9 MENA_i + \beta_{10} Asia_i + \beta_{11} LA_i + \varepsilon_i \quad (7)$$

$$ROA_i = \beta_0 + \beta_1 LDE_i + \beta_2 PaR_i + \beta_3 Age_i + \beta_4 SA_i + \beta_5 Size_i + \beta_6 Bank_i + \beta_7 NGO_i + \beta_8 EECA_i + \beta_9 MENA_i + \beta_{10} Asia_i + \beta_{11} LA_i + \varepsilon_i \quad (8)$$

$$ROA_i = \beta_0 + \beta_1 SDE_i + \beta_2 PaR_i + \beta_3 Age_i + \beta_4 SA_i + \beta_5 Size_i + \beta_6 Bank_i + \beta_7 NGO_i + \beta_8 EECA_i + \beta_9 MENA_i + \beta_{10} Asia_i + \beta_{11} LA_i + \varepsilon_i \quad (9)$$

$$ROA_i = \beta_0 + \beta_1 DA_i + \beta_2 PaR_i + \beta_3 Age_i + \beta_4 SA_i + \beta_5 Size_i + \beta_6 Bank_i + \beta_7 NGO_i + \beta_8 EECA_i + \beta_9 MENA_i + \beta_{10} Asia_i + \beta_{11} LA_i + \varepsilon_i \quad (10)$$

$$ROA_i = \beta_0 + \beta_1 LDA_i + \beta_2 PaR_i + \beta_3 Age_i + \beta_4 SA_i + \beta_5 Size_i + \beta_6 Bank_i + \beta_7 NGO_i + \beta_8 EECA_i + \beta_9 MENA_i + \beta_{10} Asia_i + \beta_{11} LA_i + \varepsilon_i \quad (11)$$

$$ROA_i = \beta_0 + \beta_1 SDA_i + \beta_2 PaR_i + \beta_3 Age_i + \beta_4 SA_i + \beta_5 Size_i + \beta_6 Bank_i + \beta_7 NGO_i + \beta_8 EECA_i + \beta_9 MENA_i + \beta_{10} Asia_i + \beta_{11} LA_i + \varepsilon_i \quad (12)$$

$$i \in \{1,2, \dots, n\}$$

The above models test the following hypothesis:

H_0: $\beta_i = 0$

H_1: $\beta_i \neq 0$

for $i \in \{1,2, \dots ,7\}$

4.4 Data analyzing tools

SPSS and STATA were used to analyze the data. Both of these are well known statistical programs and a reliable tool for analyzing quantitative data.

5. DATA ANALYSIS AND FINDINGS

This chapter presents the data analysis and finding carried out to determine the effect of capital structure on the financial performance of MFIs. The chapter includes regression diagnostics, descriptive statistics and results of the regressions.

5.1 Regression diagnostics

Unusual and influential data

The first part in the data screening process is to check for unusual and influential data. An observation is called influential if removing the observation will change the regression results substantially. This kind of data is called outliers and is observations where the dependent variable value is unusual given its value on the independent variables. Multiple regressions are very sensitive to outliers and can make a large difference in the regression analysis results. Outliers have large residuals (Brunin, 2006b; Pallant, 2007).

There are many different methods for identifying unusual and influential data, in this study I use three different measures, taken from (Brunin, 2006b) and (Cohen, Cohen, West, & Aiken, 2003):

- Leverage; an observation with an extreme value on a independent variable is called a point with high leverage.
- Cook's D combines information on the residual and leverage, and can be thought of as a general measure of influence
- DFBETA is another type of influential measure, which is a deletion statistic that compares regression coefficients when case *i* is included versus not included in the sample.

Table 5-1: Critical values for unusual and influential data

Measure	**Critical value**
Leverage	$> (2k + 2)/n$
Cook's D	$> 4/n$
Absolute (r-studentized)	> 2
DFBETA	$> 2/\sqrt{n}$
k – number of predictors	
n – number of observations	

For the COF model (regression models number 1-6) I got maximum Cook's D values from 0,570 to 0,895 and maximum leverage values from 0,262 to 0,864. When I looked at the studentized residuals, leverage and Cook's D for the COF models there were ten cases that was standing out as outliers, all of them with high values for two or more of this measures, this was case number 9, 83, 84, 111, 117, 160, 175, 191, 298 and 384.

For the ROA model (regression models number 7-12) I got maximum Cook's D values from 0,309 to 1,351 and maximum leverage values from 0,290 to 0,842. When I looked at the studentized residuals, leverage and Cook's D for the COF models there were five cases that was standing out as outliers, all of them with high values for two or more of this measures, this was case number 52, 90, 117, 169, 170, 191, 353 and 336.

I also took the DFBETAs test on all the models, and I did not find any cases far below the critical values, so all of the cases above seem to be valid observations, but all of these cases make a large impact on the models, therefore I decided to exclude case number 9, 52, 83, 84, 90, 111, 117, 160, 169, 170, 175, 191, 298, 336, 353 and 384 from the sample. As mentioned before I have already excluded case number 194 and 198, due to missing data, so the total number of cases used in this study will be 387. Without these values the critical values decreased substantially. Maximum Cook's D values in the COF model went down to values between 0,065 and 0,213 and the maximum leverage values from 0,247 to 0,347. In the ROA model the maximum Cook's D values went down to values between 0,070 and 0,159 and the maximum leverage values from 0,220 to 0,442.

Test of the classical assumptions

As stated above, in order for the OLS estimators to be the best available, the classical assumptions must hold. Because of this, an important part of the regression analysis is to determine whether these assumptions hold for a particular equation, which I will test now for my models. If they do not hold, some assumptions has to be made (Brooks, 2008).

The fist assumption states that the error term must have a zero mean. As we can see from table 5-2, the first assumption holds for all of the models. In fact, this assumption will never be violated if there is a constant term in the regression equation (Brooks, 2008).

Table 5-2: Descriptive statistics for the models residuals

Model/Residuals	Minimum	Maximum	Mean	Std. Diviation	N
COF (model 1)	-0,094625	0,183233	0,000000	0,047781	343
COF (model 2)	-0,095478	0,183841	0,000000	0,047757	338
COF (model 3)	-0,093947	0,183629	0,000000	0,047855	336
COF (model 4)	-0,107063	0,187666	0,000000	0,046211	343
COF (model 5)	-0,095367	0,184604	0,000000	0,047765	339
COF (model 6)	-0,111363	0,180575	0,000000	0,045874	337
ROA (model 7)	-0,239242	0,211286	0,000000	0,060401	356
ROA (model 8)	-0,240678	0,210194	0,000000	0,060768	350
ROA (model 9)	-0,235859	0,210533	0,000000	0,060972	348
ROA (model 10)	-0,196158	0,211129	0,000000	0,057970	356
ROA (model 11)	-0,187152	0,215726	0,000000	0,059082	351
ROA (model 12)	-0,240727	0,209091	0,000000	0,060794	349

Assumption two states that the error terms must have a constant variance, this means that there is no heteroskedasticity. According to (Studenmund, 2011) this assumption is likely to be violated in cross-sectional datasets, like the one used in this study. When heteroskedasticity is presence in a model, the conclusions could be misleading and unreliable (Brooks, 2008).

One of the methods for testing if heteroskedasticity is presence in the model is White's test for heteroskedasticity. The results from the White's test are presented in Table 5-3. All of the

COF models have a p-value over 10 percent or 5 percent level, which indicates no significant heteroskedasticity. But as we can see from Table 5-3, all of the ROA models have p-values below 10 percent or 5 percent level, which indicates heteroskedasticity in all of these models (Brooks, 2008; Eikemo & Clausen, 2007).

Table 5-3: White's test for heteroskedasticity

OLS Model	**p-value**	**Significant heteroskedasticity**
COF (model 1)	0,3515	No
COF (model 2)	0,4383	No
COF (model 3)	0,2674	No
COF (model 4)	0,6086	No
COF (model 5)	0,2315	No
COF (model 6)	0,4368	No
ROA (model 7)	0,0002**	Yes
ROA (model 8)	0,0000**	Yes
ROA (model 9)	0,0103**	Yes
ROA (model 10)	0,0180**	Yes
ROA (model 11)	0,0017**	Yes
ROA (model 12)	0,0139	Yes
** Significant at 5% level		
*Significant at 10% level		

As we can see from table 5-3, assumption number two, about no heteroskedasticity, is violated for all the ROA models, and therefore adjustments have to be made.

To solve the problem of heteroskedasticity White developed an estimator for standard errors that is robust in the presence of heteroskedasticity. This technique works best in large samples. The effect of using the White-correction is that, if the variance of the errors is positively related to the square of an explanatory variable, the standard errors for the slope coefficients are increased relative to the usual OLS standard errors, which would make hypothesis testing more "conservative", so that more evidence would be required against the null hypothesis before it would be rejected (Brooks, 2008). I ran regressions with robust standard errors for all ROA models in STATA.

The third assumption is that the error terms are linearly independent of one another, in other words this assumption requires no serial correlation (or autocorrelation). Serial correlation means correlation between values from the same variable between different units. Serial correlation can be examined by using the Durbin-Watson test. If the results of the Durbin-Watson test are close to 2, serial correlation is not a problem(Eikemo & Clausen, 2007). As we can see from Table 5-4, all of the Durbin-Watson values lies close to 2, so there does not seem to be a problem with serial correlation, hence assumption three holds for the models.

Table 5-4: Serial correlation, Durbin-Watson test

OLS Model	**Durbin-Watson value**
COF (model 1)	1,825
COF (model 2)	1,815
COF (model 3)	1,832
COF (model 4)	1,788
COF (model 5)	1,792
COF (model 6)	1,904
ROA (model 7)	1,955
ROA (model 8)	1,945
ROA (model 9)	1,960
ROA (model 10)	1,927
ROA (model 11)	1,935
ROA (model 12)	1,957
Critical value: <1,0 or >3,0	

Assumption four states that there should be no relationship between the error term and corresponding explanatory variables. I have checked all of the explanatory variables and all of them are uncorrelated with the error term. The Pearson correlation coefficients were all equal to one and the Sig. 1-tailed correlations were all equal to zero. So assumption number four holds.

The fifth assumption states that the error term has to be normally distributed. If the residuals have a strong deviation from normality, it will affect the hypothesis testing. But according to the central limit theorem, the sampling distribution of the mean of any random sample of observations will tend towards the normal distribution, as the sample size tends to infinity

(Brooks, 2008). So the we can argue that deviation from the normal distribution will not have large impact on the results of the hypothesis testing due to the large number of samples used in this study (Eikemo & Clausen, 2007). To identify any deviation from normality I used residual plots, skewness and kurtosis and the Kolmogorov-Smirnov and Shapiro-Wilk test. The distributions from the residuals from the COF model (Model 1) and the ROA model (model7) are presented in Figure 5-1 and 5-2 (the rest of the models are not represented here). All of the models tend towards the normal distribution, peak of the histogram lies around zero, but they look a bit sharper, and the tails are not quite equal.

Figure 5-1: Distribution from the residuals from the COF model (Model 1)

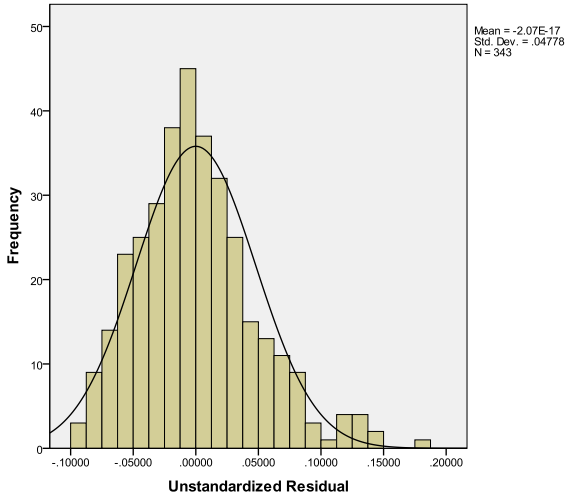
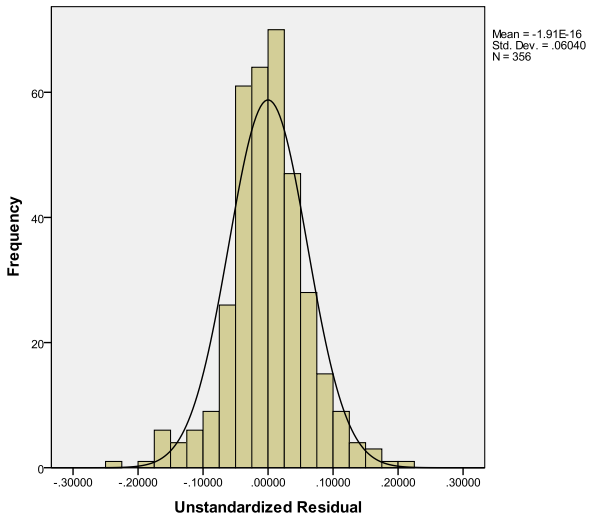


Figure 5-2: Distribution from the residuals from the ROA model (Model 7)



I also examined the skewness and kurtosis, skewness measures the extent to which a distribution is not symmetric about its mean value and kurtosis measures how fat the tails of the distribution are (Brooks, 2008). The result of the skewness and kurtosis are presented in table 5-5.

Table 5-5: Skewness and kurtosis

OLS Model	**Skewness**	**Kurtosis**
COF (model 1)	0,634	0,636
COF (model 2)	0,662	0,695
COF (model 3)	0,657	0,651
COF (model 4)	0,778	0,992
COF (model 5)	0,682	0,712
COF (model 6)	0,670	0,700
ROA (model 7)	-0,137	1,555
ROA (model 8)	-0,151	1,512
ROA (model 9)	-0,126	1,441
ROA (model 10)	-0,039	1,348
ROA (model 11)	-0,098	1,143
ROA (model 12)	-0,122	1,539

Positive skewness values indicate that the scores are clustered to the left, at the low end of the graph. While negative skewness values indicate a clustering of scores to the right, at the high end of the graph (Pallant, 2007). As we can see from Table 5-5, all of the COF models have a small skewness to the left and kurtosis, and the ROA models have small skewness to the right and moderate kurtosis. To test whether or not the models have a normal distribution I performed the Kolmogorv-Smirnov and the Shapiro-Wilk tests on all of the models. We can see that all of the values in Table 5-6 for the Kolmogorv-Smirnov test is higher than 0,05 so we can not reject the hypothesis that the residuals are normal distributed at a 5 percent significance level. The values in the Shapiro-Wilk test lies between zero and one, where values close to one indicates normality of the data (Razali & Wah, 2011). As we can see all of the values from the Shapiro-Wilk test lies close to one, which indicates normality. This means that assumption number five holds.

Table 5-6: Kolmogorv-Smirnov and Shapiro-Wilk test

OLS Model	Kolmogorv-Smirnov p-value	Shapiro-Wilk p-value
COF (model 1)	0,067	0,975
COF (model 2)	0,060	0,973
COF (model 3)	0,056	0,973
COF (model 4)	0,055	0,967
COF (model 5)	0,062	0,972
COF (model 6)	0,056	0,973
ROA (model 7)	0,066	0,979
ROA (model 8)	0,066	0,979
ROA (model 9)	0,065	0,980
ROA (model 10)	0,060	0,982
ROA (model 11)	0,058	0,983
ROA (model 12)	0,068	0,979
Reject if p<0,05		

I have also tested the models for multicollinearity, which means correlation between explanatory variables. The term collinearity implies that two variables are close to being perfect linear combinations of one another. If there are more than two variables involved in this it is often called multicollinearity (Brunin, 2006a). When the problem of multicollinearity get large, it will be difficult to distinguish between the effects of the different variables. It will also lead to inaccurate estimates and the significance values will get large (Eikemo & Clausen, 2007). I checked the Pearson correlation, which varies between -1 and 1, if the p-value is 0, there is no linear correlation, and if the p-value is -1 or 1 we have a perfectly negative or positive relationship between the variables. According to Eikemo & Clausen (2007) values over 0,8 for the Pearson correlation should be taken a closer look at. I also checked the VIF (Variance inflating factor) and the tolerance. Tolerance is an indicator of how much of the variability of the specified explanatory variable that is not explained by the other explanatory variables in the model, if this value is very small (less than 0,1), it indicates that the multiple correlation with the other variables is high and suggesting that there is a possibility of multicollinearity. Tolerance is calculated using the formula 1-R squared for each variable. VIF is the inverse of the Tolerance value, 1 divided by Tolerance. Values over 10 for the VIF values would be a concern here, indicating multicollinearity (Pallant, 2007).

I have checked all of my twelve models, and all of the correlation values are far below the critical values, so there is no need to worry about multicollinearity affecting the data.

Diagnostics summary

I have excluded 2 of the 405 cases because of missing data, and also 16 cases due to influential data, so the total number of cases in this analysis is 387. To deal with the problem of heteroskedasticity in the ROA models (model 7-12), I performed a robust regression analysis which are presented in table 5-20 to 5-23.

5.2 Descriptive statistics

Table 5-7 presents the descriptive statistics from the dependent, explanatory and the control variables used in the following analysis. The statistics which are presented in this table are after removal of unusual and influential data**.**

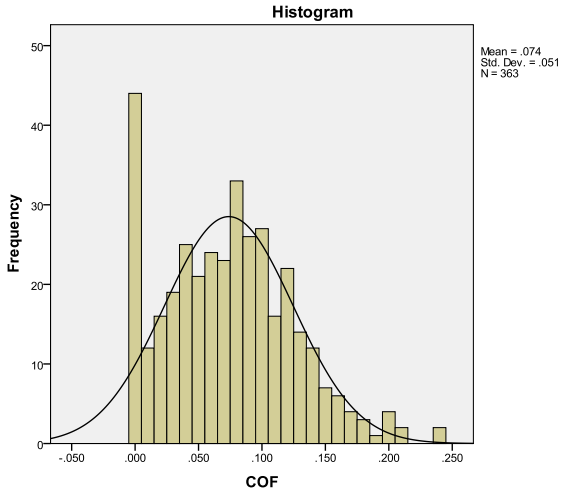
As we can see from Table 5-7, all of the variables have a solid sample size, and the share of missing data is ranging from 0-6 percent, where COF have the most missing data.

Table 5-7: Descriptive statistics

Variable	N	Minimum	Maximum	Mean	Std.Deviation
COF	363	0,000	0,240	0,07386	0,050784
ROA	375	-0,250	0,270	0,03552	0,067068
DE	382	-57,60	99,75	4,2944	12,34635
LDE	376	-45,36	99,37	2,5075	10,44140
SDE	374	-27,89	59,10	1,8605	5,07890
DA	382	0,00	1,40	0,5378	0,28697
SDA	375	0,00	1,37	0,3143	0,26288
LDA	377	-0,37	1,21	0,3315	0,28651
PaR	374	0,00	0,680	0,05751	0,079171
Age	384	1	43	10,7734	6,62129
SA	376	0,00	1,14	0,1165	0,22939
Size	383	11,69	19,33	15,1921	1,29647
Bank	387	0	1	0,05	0,227
NGO	387	0	1	0,50	0,501

EECA	387	0	1	0,18	0,385
MENA	387	0	1	0,04	0,193
Asia	387	0	1	0,16	0,365
LA	387	0	1	0,38	0,485
Africa	387	0	1	0,25	0,431

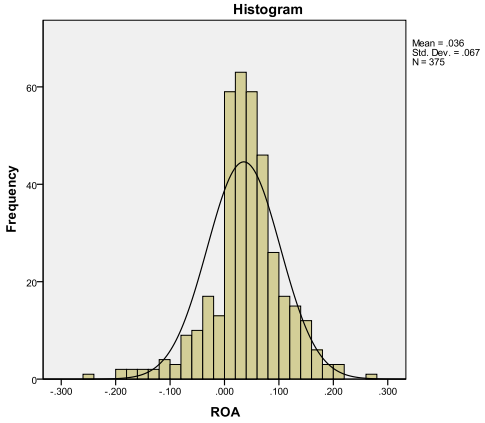
Figure 5-3: Frequency of the cost of funds



Cost of funds

The cost of funds ratio measures the average cost of the MFIs borrowed funds. The mean value of cost of funds is 0,07386 which indicates approximately 7,4 percent, this number is greater than the mean value of ROA of approximately 3,5 percent, this is not a good sign, since it means that the MFIs have to spend more to earn less.

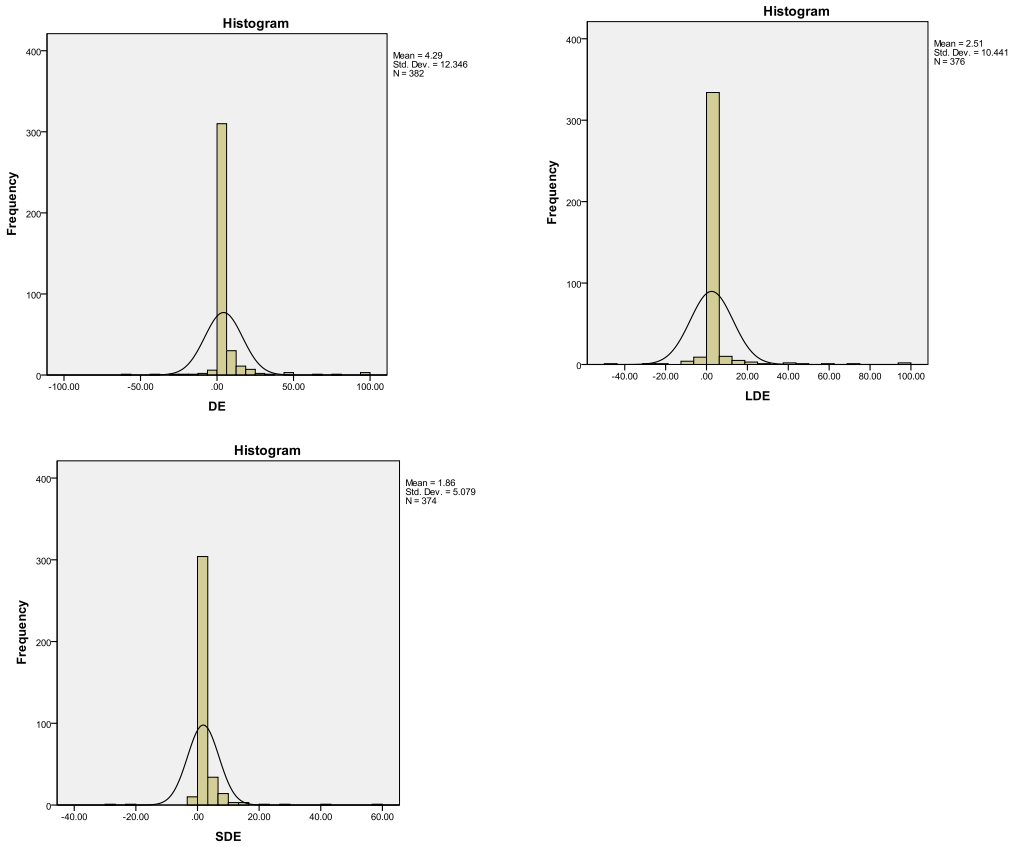
Figure 5-4: Frequency of the Return on Assets



Return on Assets

The mean value of ROA is slightly positive, at approximately 3,55 percent (0,03552). Which according to Mersland, Randøy & Strøm (2011) this reflects that a large number of the MFIs are not self-sufficient and they do not pay their true cost of capital (Mersland, Randøy, & Strøm, 2011). The minimum value of ROA is -0,250, which is an indication of unprofitable MFIs.

Figure 5-5: Frequency of the DE, LDE and SDE

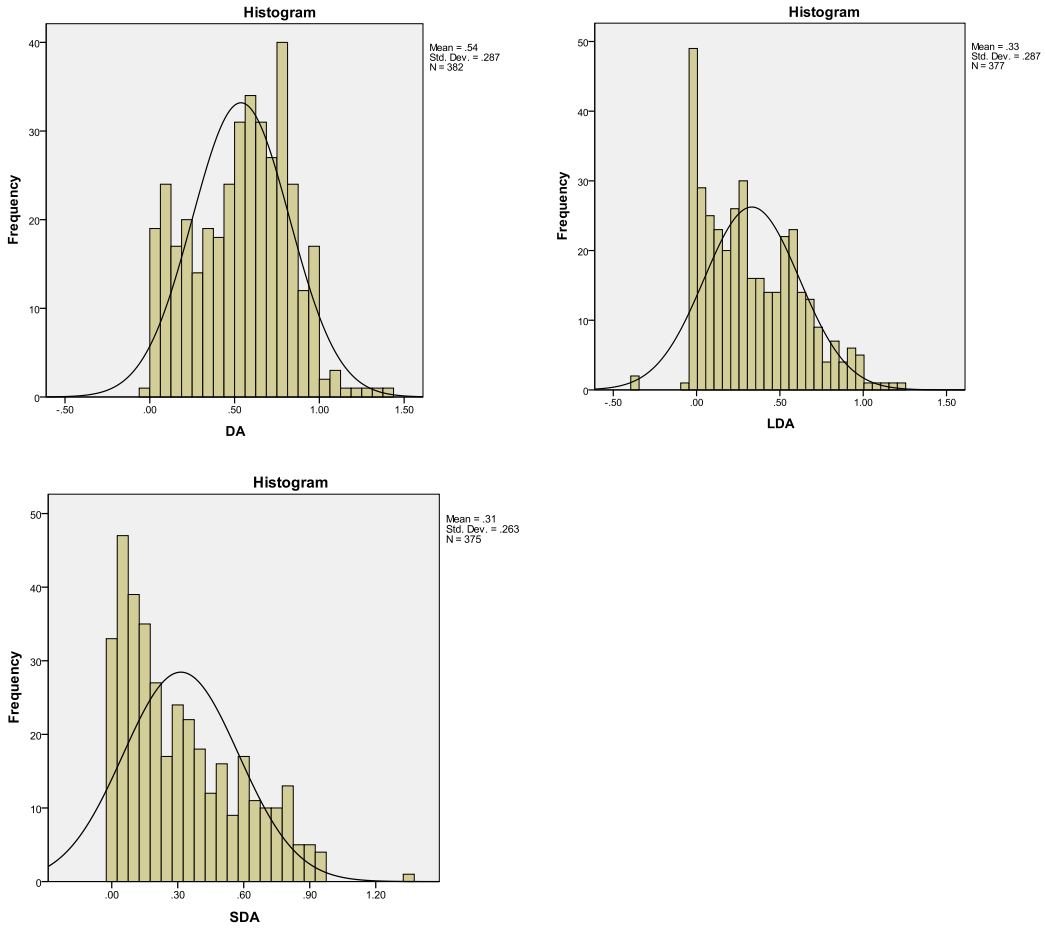


Debt to Equity, Long Term Debt to Equity and Short Term Debt to Equity

The mean value of debt to assets ratio is 4,2944 which indicates that most of the MFIs are highly leveraged, they use approximately four times more debt financing than equity. The minimum value of debt to equity is -57,60, maximum value is 99,75 and a standard deviation of 12,34635, this shows that there is a huge variation in the MFIs sector regarding leverage, which we also can see if we look at the histogram in Figure 5-5. Long term debt to equity has a mean value of 2,5075, and the mean value of short term debt to equity is 1,8605 this indicates that the MFIs depends more on long term debt than on short term debt. When

summing up, all of these values mean that MFIs depends severely more on debt financing than on equity financing.

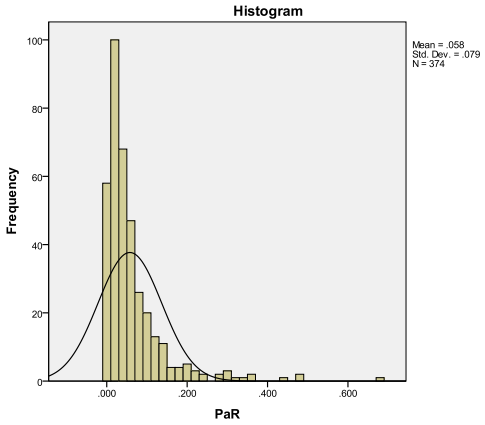
Figure 5-6: Frequency of the DA, LDA and SDA



Debt to Assets, Long Term Debt to Assets and Short Term Debt to Assets

The mean value of debt to asset is 0,5378 which indicates that approximately 54 percent of the total assets is financed by debt, this means that the MFIs depends largely on debt financing. The minimum value of debt to assets is 0,00 and the maximum value is 1,40, while the standard deviation is 0,28697, which indicates that there is a spread within the MFI sector when it comes to the levels of leverage, this can also be shown in Figure 5-6. Long term debt do assets and short term debt to assets seems to be quite evenly distributed, with mean values of 0,3315 and 0,3143.

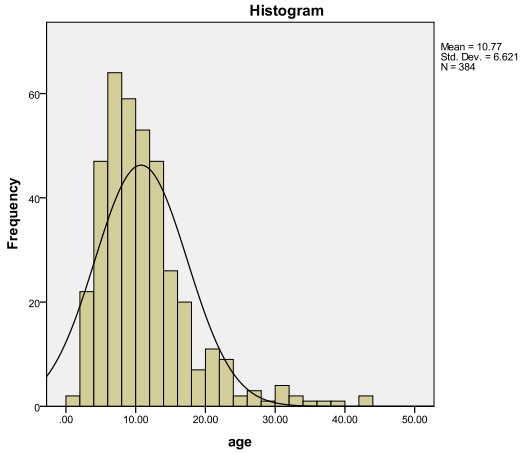
Figure 5-7: Frequency of the Portfolio at Risk.



Portfolio at Risk

The mean value of portfolio at risk is 0,05751, which indicates that approximately 5,8 percent of the MFIs loan portfolio that are 30 days or more overdue. The older delinquency is, the less likely it is that the loan will be repaid. Any portfolio at risk (PaR30) exceeding 10 percent should be cause for concern, because unlike commercial loans, most of the MFIs are not backed by bankable collateral (MicroRate & InterAmericanDevelopmentBank, 2003).

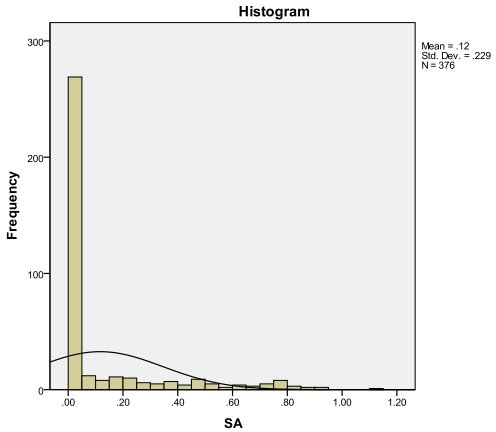
Figure 5-8: Frequency of the MFIs age



Age

The mean value of the age variable is 10,7734 which indicates that most of the MFIs are well established. The youngest of the MFIs in this study are 1 year, while the oldest are 43 years, so there is quite a spread in the age. The distribution for the age variable is shown in Figure 5-8, and we can see that it is tailed to the right.

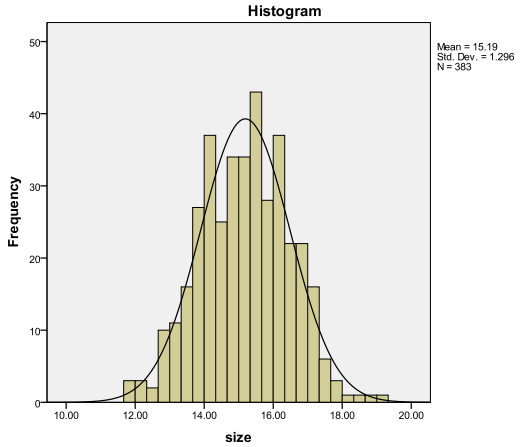
Figure 5-9: Frequency of the Savings to Asset ratio



Savings to Assets

The mean value of the savings to assets ratio is 0,1165 indicating that approximately 11,65 percent of the MFIs assets are financed by savings. The minimum value is 0, and the maximum value is 1,4 so there is quite a spread amongst the MFIs in weather they offer savings or not. From the histogram in Figure 5-9 we can see that the most frequent value is 0,00.

Figure 5-10: Frequency of the MFIs size



Size

The variable size is computed by taking the logarithm of assets. There is a wide spread in size within the MFIs included in this study. The smallest MFI has 119.750,00 USD in total assets, while the largest MFI in this study has a total of 248.115.376,00 USD in total assets. So as we can see this study includes both small scale MFIs and multimillion dollar MFIs.

Type of ownership of MFIs

There are different types of ownership of the MFIs included in this study, and as we can see from Table 5-7, 5 percent of the MFIs are banks, but the majority of them, a total of 50 percent, are NGOs.

Regional control variables

As we can see from the descriptive statistics, the MFIs are located indifferent regions, this has already been presented in Figure 3-1. There are some small deviations between the numbers in the descriptive statistics and Figure 3-1, because of the exclusion of some cases due to unusual and influential data.

5.3 Regression results

In this section I will present the results and discussion of the regression analyzes. I have earlier presented hypotheses about the effect of capital structure on MFIs performance, and now it is time to confirm or reject the hypotheses. The regression analyses were carried out to determine the relationship between capital structure and performance of MFIs. Measures of performance, cost of funds and ROA, were regressed against different measures of capital structure.

The null hypothesis is usually rejected if the test is statistically significant at the chosen significance level. But there are two types of error that can be made when using hypothesis tests:

1. Rejecting H_0 when it actually was true; this is called a type I error.
2. Not rejecting H_0 when it actually was false; this is called a type II error.
   (Brooks, 2008, p. 64)

The probability of a type I error is equal to the significance level, so in this study there is a 10 percent chance of making a type I error. We could reduce this percent by choosing a 5 percent significance level, but that would also reduce the probability that the null hypothesis would be rejected, hence increasing the probability of a type II error (Brooks, 2008).

Before I present the result of the regressions a significance level has to be chosen. Studenmund (2011) recommends using a 5 percent significance level, but he also states that it

makes sense to use a 10 percent level when the risk of type II errors are high. In this study I have used both 5 and 10 percent significance levels, but with a main focus on the 5 percent level.

If the null hypothesis is rejected at the 10 or 5 percent level, we can say that the result of the regression is statistically significant. But on the other hand if the null hypothesis is not rejected, we can say that the regression is not significant, or that it is insignificant (Brooks, 2008).

The marginal significance level is listed in the tables of the regressions as the p-value. A p-value for a t-score is the probability of observing the t-value in that size or larger, if the null hypothesis were true. I have also included the t-values in the tables of the regressions, but I will mainly emphasize in the p-values. Because the p-value is a probability, it ranges between 0 and 1. This value tells us the lowest level of significance at which we can reject the null hypothesis. Small p-values casts doubt on the null hypothesis, so in order to reject a null hypothesis, we need a low p-value (Studenmund, 2011). The decision rule used in the following regression analysis is stated below.

Decision rule:

If $p > 0{,}10$ Reject H_0

If $< 0{,}10$ Do not reject H_0

I have also performed F-testes, which provides a formal hypotheses test of the overall fit of the models. The F-test tests the hypothesis that the predicted values show no relationship to the dependent value. A low significance value in the F-test indicates that we have a good model fit (Studenmund, 2011).

As explained above, the F-test measures the overall fit of the model, but the simplest and most commonly used measure of fit is R^2. This is a measure of the overall fit, and tells us how much of the variance in the dependent variable is explained by the model. R^2 must lie in the interval between 0 and 1. A value close to 1 show an excellent overall fit and indicates that the model explains almost all of the variance in the dependent variable. A value close to 0 indicates that the model is not a very god fit for the data. The goodness of fit is relative to the topic of the study. In cross sectional data, like in this study, the R^2s are often low because the

observations differ in ways that is not easily quantified. It is important to know that a high value of R^2 does not necessarily indicate a good model.

One problem with R^2 is that adding another independent variable to the model can never decrease R^2. To compensate for this there is made a modification to R^2, which is called adjusted R^2. Pallant (2007) states that if the sample is small it we should consider reporting the adjusted R^2 rather than the normal R^2 (Pallant, 2007; Studenmund, 2011). In this study there was not much difference between adjusted R^2 and R^2, so I will focus on R^2.

Regression model 1, 2 and 3

The regression using cost of funds (COF) as the dependent variable as a measure of performance of MFIs and debt to equity (DE), long term debt to equity (LDE) and short term debt to equity (SDE) as a measure of capital structure is presented in Tables 5-8, 5-9 and 5-10. The F- test indicates that the models are good fits. Note that only 11,4 percent (R^2 = 0,114 in Model 1), 11,2 percent (R^2 = 0,112 in Model 2) and 11,5 percent (R^2 = 0,115 in Model 3) of the cost of funds ratio is explained by the explanatory variables in the model. The regression models shows that all of the capital structure measures DE, LDE and SDE does not have a significantly impact on cost of funds of MFIs. We can also observe that some of the control variables, portfolio at risk, age of MFIs, size of MIFs, type of MFI (bank and NGO) and MENA, does not have any statistically significant effect in any of the models.The models further reveals that the savings to assets ratio and the three regional variables EECA, Asia and LA does have a significantly affect to the cost of funds of MFIs.

In Model 1 where debt to equity is the explanatory variable, the savings to assets ratio has a 5 percent significantly negative effect on cost of funds, indicating that cost of funds will decrease by -0,041 due to a marginal increase in savings to assets, holding all the other variables constant. The three regional dummy variables EECA, Asia and LA have a positively significant effect at a 5 percent level to the cost of fund ratio.

In Model 2 where long term debt to equity is used as explanatory variable for capital structure, I also found that the savings to assets ratio has a 5 percent significantly negative effect on cost of funds, indicating that cost of funds will decrease by -0,039 due to a marginal increase in savings to assets, holding all the other variables constant. The regional dummy variables EECA, Asia and LA also have a positively significant effect at a 5 percent level to the cost of fund ratio.

Model 3 where short term debt to equity was applied as explanatory variable I found the same result as in the two previous models, savings to assets ratio has a 5 percent significantly negative effect on cost of funds, indicating that cost of funds will decrease by -0,044 due to a marginal increase in savings to assets, holding all the other variables constant. And the regional dummy variables EECA, Asia and LA have a positively significant effect at a 5 percent level to the cost of fund ratio.

Table 5-8: Model 1: Regression result from the COF Model

$\mathbf{X_k}$	$\widehat{\boldsymbol{\beta}}$	SE($\widehat{\boldsymbol{\beta}}_k$)	Standardized $\widehat{\boldsymbol{\beta}}_k$	t-value	p-value
(constant)	0,030	0,035		0,882	0,379
DE	5,249E-5	0,000	0,011	0,215	0,830
PaR	0,008	0,037	0,012	0,204	0,838
Age	0,000	0,000	-0,046	-0,785	0,433
SA	-0,041	0,015	-0,179	-2,772	0,006**
Size	0,002	0,002	0,056	0,957	0,339
Bank	-0,011	0,012	-0,052	-0,907	0,365
NGO	-0,010	0,006	-0,100	-1,618	0,107
EECA	0,031	0,009	0,233	3,487	0,001**
MENA	0,015	0,014	0,059	1,012	0,312
Asia	0,032	0,010	0,216	3,322	0,001**
LA	0,033	0,007	0,317	4,374	0,000**
Dependent variable: COF					
R^2: 0,114					
F-test: 0,000					
N: 343					
**Significant at 5% level					
*Significant at 10% level					

Table 5-9: Model 2: Regression result from the COF Model

$\mathbf{X_k}$	$\widehat{\boldsymbol{\beta}}$	SE($\widehat{\boldsymbol{\beta}}_k$)	Standardized $\widehat{\boldsymbol{\beta}}_k$	t-value	p-value
(constant)	0,031	0,034		0,912	0,362
LDE	-7,126E-5	0,000	-0,013	-0,243	0,808

PaR	0,004	0,037	0,006	0,102	0,918
Age	0,000	0,000	-0,049	-0,832	0,406
SA	-0,039	0,015	-0,173	-2,670	0,008**
Size	0,002	0,002	0,055	0,935	0,351
Bank	-0,011	0,012	-0,051	-0,887	0,376
NGO	-0,010	0,006	-0,102	-1,641	0,102
EECA	0,030	0,009	0,229	3,425	0,001**
MENA	0,015	0,014	0,061	1,040	0,299
Asia	0,033	0,010	0,226	3,436	0,001**
LA	0,032	0,007	0,315	4,358	0,000**
Dependent variable: COF					
R^2: 0,112					
F-test: 0,000					
N: 338					
**Significant at 5% level					
*Significant at 10% level					

Table 5-10: Model 3: Regression result from the COF Model

$\mathbf{X_k}$	$\widehat{\boldsymbol{\beta}}$	SE($\widehat{\boldsymbol{\beta}}_k$)	Standardized $\widehat{\boldsymbol{\beta}}_k$	t-value	p-value
(constant)	0,029	0,035		0,841	0,401
SDE	0,001	0,001	0,076	1,343	0,180
PaR	0,007	0,038	0,010	0,176	0,861
Age	0,000	0,000	-0,040	-0,667	0,505
SA	-0,044	0,15	-0,195	-2,916	0,004**
Size	0,002	0,002	0,056	0,951	0,342
Bank	-0,012	0,012	-0,056	-0,968	0,334
NGO	-0,009	0,006	-0,088	-1,411	0,159
EECA	0,029	0,009	0,223	3,323	0,001**
MENA	0,015	0,015	0,060	1,017	0,310
Asia	0,032	0,009	0,218	3,392	0,001**
LA	0,031	0,008	0,304	4,186	0,000**
Dependent variable: COF					

R^2: 0,115

F-test: 0,000

N: 336

**Significant at 5% level

*Significant at 10% level

Regression model 4, 5 and 6

The regression using cost of funds (COF) as the dependent variable as a measure of performance of MFIs and debt to assets (DA), long term debt to assets (LDA) and short term debt to assets (SDA) as a measure of capital structure is presented in Tables 5-11, 5-12 and 5-13. The F- test indicates that the models are good fits. The control variables portfolio at risk, age of MFIs, size of MIFs, type of MFI (bank and NGO) and MENA does not have any statistically significant effect in any of the models.

Regression Model 4, which considered the debt to assets ratio as the explanatory variable, has an R^2 of 0,167, this indicates that 16,7 percent of the cost of funds ratio is explained by the explanatory variables in the model. This model reveals a very significant relationship between the debt to assets ratio and the cost of funds, with a p-value lower than 0,001. There is in other words a 99,9 percent chance that debt to assets has an effect on the overall MFIs performance. A $\hat{\beta}$ value of 0,052 indicates that the cost of funds ratio increases with 0,052 with a marginal increase in debt to assets. We can also see that this is supported by a low standard error (0,011) and it also has the largest standardized $\hat{\beta}_k$ coefficient (0,290) in the model, which means that debt to assets makes the strongest unique contribution to explaining the cost of funds, when the variance explained by all other variables in the model is controlled for. I also found the regional dummy variables EECA, Asia and LA to have a significantly positive effect on the performance, measured by cost of funds.

In Model 5 long term debt to assets ratio was applied as a measure of capital structure of the MFIs. The R^2 of 0,113 indicates that 11,3 percent of the cost of funds ratio is explained by the explanatory variables in the model. Long term debt to assets has a slightly positive, but not significant effect on the MFIs performance, measured by cost of funds. The savings to assets have a significantly negative effect on the cost of funds, it has a $\hat{\beta}$ value of -0,038 which indicates that the cost of funds ratio decreases with 0,038 with a marginal increase in the

savings to assets ratio. Also in this model I found the regional dummy variables EECA, Asia and LA to have a significantly positive effect on the performance, measured by cost of funds.

Model 6 shows the regression results using cost of funds ratio as the dependent variable measuring overall performance and short term debt to assets as the explanatory variable measuring capital structure. The R^2 of 0,187 indicates that 18,7 percent of the cost of funds ratio is explained by the explanatory variables in the regression model. Short term debt to assets is very significant with a p-value lower than 0,001. This is also supported by a high t-value (5,462) and the standardized $\hat{\beta}_k$ coefficient (0,385) indicates a strong impact on the cost of fund ratio. The $\hat{\beta}$ value of 0,078 indicates that the cost of funds ratio increases with 0,078 with a marginal increase in short term debt to assets. Savings to assets also have a very significant p-value lower than 0,001. The $\hat{\beta}$ value for the savings to assets ratio of -0,089 indicates that the cost of funds ratio decreases with -0,098 with a marginal increase in the savings to assets ratio. This model also shows that the regional dummy variables EECA, Asia and LA with a p-value lower than 0,001 has a very significantly positive effect on the performance, measured by cost of funds. The regional dummy variable MENA is also having a positively significant effect at a 10 percent level to the cost of fund ratio.

Table 5-11: Model 4: Regression result from the COF Model

$\mathbf{X_k}$	$\widehat{\boldsymbol{\beta}}$	SE($\widehat{\boldsymbol{\beta}}_k$)	Standardized $\widehat{\boldsymbol{\beta}}_k$	t-value	p-value
(constant)	0,001	0,034		0,036	0,971
DA	0,052	0,011	0,290	4,647	0,000**
PaR	0,008	0,036	0,013	0,231	0,817
Age	0,000	0,000	-0,023	-0,401	0,689
SA	-0,011	0,015	-0,049	-0,715	0,475
Size	0,002	0,002	0,054	0,957	0,339
Bank	-0,011	0,012	-0,052	-0,944	0,346
NGO	-0,009	0,006	-0,085	-1,421	0,156
EECA	0,032	0,009	0,239	3,703	0,000**
MENA	0,023	0,014	0,092	1,607	0,109
Asia	0,017	0,010	0,120	1,823	0,069*
LA	0,028	0,007	0,276	3,917	0,000**

Dependent variable: COF

R^2: 0,167

F-test: 0,000

N: 343

**Significant at 5% level

*Significant at 10% level

Table 5-12: Model 5: Regression result from the COF Model

X_k	$\widehat{\beta}$	SE($\widehat{\beta}_k$)	Standardized $\widehat{\beta}_k$	t-value	p-value
(constant)	0,027	0,035		0,782	0,435
LDA	0,007	0,012	0,039	0,597	0,551
PaR	0,005	0,037	0,008	0,140	0,889
Age	0,000	0,000	-0,046	-0,778	0,437
SA	-0,038	0,015	-0,167	-2,528	0,012**
Size	0,002	0,002	0,059	1,006	0,315
Bank	-0,011	0,012	-0,051	-0,892	0,373
NGO	-0,010	0,006	-0,101	-1,619	0,106
EECA	0,030	0,009	0,224	3,338	0,001**
MENA	0,015	0,014	0,061	1,034	0,302
Asia	0,029	0,011	0,200	2,704	0,007**
LA	0,032	0,008	0,307	4,165	0,000**

Dependent variable: COF

R^2: 0,113

F-test: 0,000

N: 339

**Significant at 5% level

*Significant at 10% level

Table 5-13: Model 6: Regression result from the COF Model

X_k	$\widehat{\beta}$	SE($\widehat{\beta}_k$)	Standardized $\widehat{\beta}_k$	t-value	p-value
(constant)	0,016	0,033		0,495	0,621
SDA	0,078	0,014	0,385	5,462	0,000**

PaR	0,029	0,036	0,044	0,810	0,419
Age	0,000	0,000	-0,042	-0,739	0,460
SA	-0,089	0,017	-0,394	-5,330	0,000**
Size	0,001	0,002	0,034	0,600	0,549
Bank	-0,012	0,012	-0,056	-1,019	0,309
NGO	-0,006	0,006	-0,063	-1,056	0,292
EECA	0,039	0,009	0,293	4,496	0,000**
MENA	0,026	0,014	0,105	1,849	0,065*
Asia	0,044	0,009	0,300	4,746	0,000**
LA	0,037	0,007	0,362	5,186	0,000**

Dependent variable: COF

R^2: 0,187

F-test: 0,000

N: 337

**Significant at 5% level

*Significant at 10% level

Regression model 7, 8 and 9

The regression using return of assets (ROA) as the dependent variable as a measure of performance of MFIs and debt to equity (DE), long term debt to equity (LDE) and short term debt to equity (SDE) as a measure of capital structure is presented in Tables 5-14, 5-15 and 5-16. The F- tests with p-values of 0,000 indicates that the models are good fits. The control variables age of MFIs, savings to assets, type of MFI (bank and NGO) and Asia does not have any statistically significant effect in any of the models.

Model 7 shows the regression results using debt to equity as the explanatory variable as a measure of the capital structure of MFIs. The R^2 of 0,204 indicates that 20,4 percent of the return on assets is explained by the explanatory variables in the model. The debt to equity ratio has a p-value of 0,466 which means that this variable does not have any statistically significant effect on the performance in this model. Portfolio at risk (PaR) has a negatively significant effect on return on assets at a 5 percent level, indicating that return on assets will decrease by -0,156 due to a marginal increase in portfolio at risk. Size of MFIs has a 5 percent statistically significant positive effect on the performance, measured by return on

assets. The $\hat{\beta}$ value for the size of MFIs of 0,009 indicates that the return on assets ratio increases with 0,009 with a marginal increase in MFIs size. This model also shows that the regional dummy variables EECA, MENA and LA with have significantly positive effect on the performance, measured by return on assets.

Model 8 considered the long term debt to equity as a measure of MFIs capital structure. The models R^2 of 0,209 indicates that 20,9 percent of the return on assets is explained by the explanatory variables in the model. The long term debt to equity ratio has a p-value of 0,313 which indicates that this variable does not have any statistically significant effect on the performance in this model. The portfolio at risk is statically significant at a 5 percent level, hence the p-value is 0,001, and the $\hat{\beta}$ value for portfolio at risk of -0,157 indicates that the return on assets ratio decreases with -0,157 with a marginal increase in portfolio at risk. The size of MFIs also have a statically significant effect on the performance at a 5 percent level. The $\hat{\beta}$ value MFIs size of 0,009 indicates that the return on assets ratio increases with 0,009 with a marginal increase in MFIs size. The regional dummy variables EECA, MENA and LA also have significantly positive effect on the performance, measured by return on assets.

In Model 9 short term debt to equity was applied as a measure of capital structure of the MFIs. The models R^2 of 0,206 indicates that 20,6 percent of the return on assets is explained by the explanatory variables in the model. The short term debt to equity ratio has a p-value of 0,953 which indicates that this variable does not have any statistically significant effect on the performance in this model. Portfolio at risk on the other hand has a p-value of 0,001 that indicates significance at a 5 percent level. The $\hat{\beta}$ value for portfolio at risk is -0,155 which indicates that the return on assets ratio decreases with -0,155 with a marginal increase in portfolio at risk. Size of MFIs has a slightly positive statically significant effect on the performance at a 5 percent level. The $\hat{\beta}$ value MFIs size of 0,009 indicates that the return on assets ratio increases with 0,009 with a marginal increase in MFIs size. We can also see that the regional dummy variables EECA, MENA and LA have significantly positive effect on the performance, measured by return on assets.

Table 5-14: Model 7: Regression result from the ROA Model

$\mathbf{X_k}$	$\widehat{\boldsymbol{\beta}}$	**SE**($\widehat{\boldsymbol{\beta}}_{\boldsymbol{k}}$)	**Standardized** $\widehat{\boldsymbol{\beta}}_{\boldsymbol{k}}$	**t-value**	**p-value**
(constant)	-0,126	0,044		-2,889	0,004**

DE	-2,347E-4	0,000	-0,036	-0,730	0,466
PaR	-0,156	0,045	-0,180	-3,441	0,001**
Age	0,000	0,001	-0,027	-0,494	0,622
SA	-0,004	0,018	-0,013	-0,214	0,830
Size	0,009	0,003	0,167	3,096	0,002**
Bank	0,019	0,015	0,065	1,234	0,218
NGO	0,009	0,008	0,068	1,180	0,239
EECA	0,048	0,011	0,277	4,440	0,000**
MENA	0,063	0,018	0,187	3,459	0,001**
Asia	0,012	0,012	0,065	1,066	0,287
LA	0,047	0,009	0,341	5,045	0,000**
Dependent variable: ROA					
R^2: 0,204					
F-test: 0,000					
N: 356					
**Significant at 5% level					
*Significant at 10% level					

Table 5-15: Model 8: Regression result from the ROA Model

$\mathbf{X_k}$	$\widehat{\boldsymbol{\beta}}$	SE($\widehat{\boldsymbol{\beta}}_k$)	Standardized $\widehat{\boldsymbol{\beta}}_k$	t-value	p-value
(constant)	-0,130	0,044		-2,970	0,003**
LDE	-4,372E-4	0,000	-0,050	-1,011	0,313
PaR	-0,157	0,046	-0,180	-3,430	0,001**
Age	0,000	0,001	-0,025	-0,454	0,650
SA	-0,005	0,018	-0,018	-0,299	0,765
Size	0,009	0,003	0,171	3,150	0,002**
Bank	0,019	0,016	0,065	1,222	0,223
NGO	0,010	0,008	0,075	1,302	0,194
EECA	0,048	0,011	0,273	4,381	0,000**
MENA	0,063	0,018	0,186	3,415	0,001**
Asia	0,013	0,012	0,068	1,119	0,264
LA	0,048	0,009	0,343	5,112	0,000**

Dependent variable: ROA
R^2: 0,209
F-test: 0,000
N: 350
**Significant at 5% level
*Significant at 10% level

Table 5-16: Model 9: Regression result from the ROA Model

X_k	$\widehat{\beta}$	SE($\widehat{\beta}_k$)	Standardized $\widehat{\beta}_k$	t-value	p-value
(constant)	-0,126	0,044		-2,859	0,005**
SDE	-4,087E-5	0,001	-0,003	-0,059	0,953
PaR	-0,155	0,046	-0,178	-3,375	0,001**
Age	0,000	0,001	-0,026	-0,464	0,643
SA	-0,005	0,019	-0,015	-0,240	0,810
Size	0,009	0,003	0,166	3,040	0,003**
Bank	0,020	0,016	0,067	1,256	0,210
NGO	0,010	0,008	0,074	1,284	0,200
EECA	0,048	0,011	0,271	4,325	0,000**
MENA	0,063	0,018	0,188	3,430	0,001**
Asia	0,010	0,012	0,052	0,869	0,385
LA	0,047	0,009	0,340	5,043	0,000**
Dependent variable: ROA					
R^2: 0,206					
F-test: 0,000					
N: 348					
**Significant at 5% level					
*Significant at 10% level					

Regression model 10, 11 and 12

The regression using return of assets (ROA) as the dependent variable as a measure of performance of MFIs and debt to assets (DA), long term debt to assets (LDA) and short term debt to assets (SDA) as a measure of capital structure is presented in Tables 5-17, 5-18 and 5-

19. The F- tests with p-values of 0,000 indicates that the models are good fits. The control variables age of MFIs and type of MFI (bank and NGO) does not have any statistically significant effect in any of the models.

Model 10 shows the regression results using return on assets as the dependent variable measuring overall performance and debt to assets as the explanatory variable measuring capital structure. The R^2 of 0,268 indicates that 26,8 percent of the return on assets ratio is explained by the explanatory variables in the regression model. Debt to assets is very significant with a p-value lower than 0,001. This is also supported by a high t-value (-5,467) and the standardized $\hat{\beta}_k$ coefficient (-0,307) indicates a strong impact on the return on assets ratio. The $\hat{\beta}$ value of -0,073 indicates that the return on assets ratio decreases with -0,073 with a marginal increase in debt to assets. Portfolio at risk also have a very significant p-value lower than 0,001. The $\hat{\beta}$ value for the portfolio at risk of -0,155 indicates that the return on assets ratio decreases with -0,155 with a marginal increase in the portfolio at risk. Savings to assets are statistically significant at a 5 percent level, with a $\hat{\beta}$ value of -0,048 which indicates that the return on assets ratio decreases with -0,048 with a marginal increase in the savings to asset ratio. The size of MFIs has a positive effect on return on assets, with a $\hat{\beta}$ value of 0,010 which indicates that the return on assets ratio increases with 0,010 with a marginal increase in MFIs size. All of the regional dummy variables EECA, MENA, Asia and LA also have significantly positive effect on the performance, measured by return on assets.

Model 11 presents the regression results using return on assets as the dependent variable measuring overall performance and long term debt to assets as the explanatory variable measuring capital structure. The R^2 of 0,250 indicates that 25 percent of the return on assets ratio is explained by the explanatory variables in the regression model. From the model we can see that long term debt to assets is very significant with a p-value lower than 0,001. This is also supported by a high t-value (-4,439) and the standardized $\hat{\beta}_k$ coefficient (-0,249) indicates a strong impact on the return on assets ratio. The $\hat{\beta}$ value of -0,061 indicates that the return on assets ratio decreases with -0,061 with a marginal increase in long term debt to assets. Portfolio at risk has a negatively significant effect on return on assets at a 5 percent level. The $\hat{\beta}$ value for the portfolio at risk of -0,145 indicates that the return on assets ratio decreases with -0,145 with a marginal increase in the portfolio at risk. Savings to assets has a negative effect on return on assets, but has a p-value of 0,190 and is therefore not statistically

significant. The size of MFIs has a slightly positive effect on return on assets, with a $\hat{\beta}$ value of 0,009 which indicates that the return on assets ratio increases with 0,009 with a marginal increase in MFIs size. Also in this model all of the regional dummy variables EECA, MENA, Asia and LA have significantly positive effect on the performance, measured by return on assets.

Model 12 shows the regression results using return on assets as the dependent variable measuring overall performance and short term debt to assets as the explanatory variable measuring capital structure. The R^2 of 0,209 indicates that 20,9 percent of the return on assets ratio is explained by the explanatory variables in the regression model. Short term debt to assets has a negative effect on return on assets, but has a p-value of 0,310 and hence it is not statistically significant. Portfolio at risk is statistically significant at a 5 percent level. The $\hat{\beta}$ value for the portfolio at risk of -0,161 indicates that the return on assets ratio decreases with -0,161 with a marginal increase in the portfolio at risk. Savings to assets has a p-value of 0,733 and is therefore not statistically significant. The size of MFIs has a positive effect on return on assets, with a $\hat{\beta}$ value of 0,009 which indicates that the return on assets ratio increases with 0,009 with a marginal increase in MFIs size. The regional dummy variables EECA, MENA and LA also have significantly positive effect on the performance, measured by return on assets.

Table 5-17: Model 10: Regression result from the ROA Model

$\mathbf{X_k}$	$\widehat{\boldsymbol{\beta}}$	**SE**($\widehat{\boldsymbol{\beta}}_{\boldsymbol{k}}$)	**Standardized** $\widehat{\boldsymbol{\beta}}_{\boldsymbol{k}}$	**t-value**	**p-value**
(constant)	-0,093	0,042		-2,208	0,028**
DA	-0,073	0,013	-0,307	-5,467	0,000**
PaR	-0,155	0,044	-0,178	-3,566	0,000**
Age	0,000	0,001	-0,044	-0,849	0,397
SA	-0,048	0,019	-0,159	-2,509	0,013**
Size	0,010	0,003	0,178	3,454	0,001**
Bank	0,020	0,015	0,068	1,336	0,182
NGO	0,008	0,007	0,056	1,018	0,310
EECA	0,044	0,010	0,253	4,247	0,000**
MENA	0,051	0,018	0,152	2,900	0,004**
Asia	0,028	0,011	0,147	2,478	0,014**

LA	0,052	0,009	0,375	5,786	0,000**
Dependent variable: ROA					
R^2: 0,268					
F-test: 0,000					
N: 356					
**Significant at 5% level					
*Significant at 10% level					

Table 5-18: Model 11: Regression result from the ROA Model

X_k	$\widehat{\beta}$	SE($\widehat{\beta}_k$)	Standardized $\widehat{\beta}_k$	t-value	p-value
(constant)	-0,109	0,043		-2,554	0,011**
LDA	-0,061	0,014	-0,249	-4,439	0,000**
PaR	-0,145	0,045	-0,166	-3,250	0,001**
Age	0,000	0,001	-0,027	-0,505	0,614
SA	-0,024	0,018	-0,079	-1,314	0,190
Size	0,009	0,003	0,163	3,090	0,002**
Bank	0,020	0,015	0,068	1,319	0,188
NGO	0,011	0,008	0,079	1,415	0,158
EECA	0,052	0,011	0,294	4,830	0,000**
MENA	0,061	0,018	0,182	3,438	0,001**
Asia	0,034	0,012	0,179	2,777	0,006**
LA	0,054	0,009	0,390	5,885	0,000**
Dependent variable: ROA					
R^2: 0,250					
F-test: 0,000					
N: 351					
**Significant at 5% level					
*Significant at 10% level					

Table 5-19: Model 12: Regression result from the ROA Model

X_k	$\widehat{\beta}$	SE($\widehat{\beta}_k$)	Standardized $\widehat{\beta}_k$	t-value	p-value
(constant)	-0,122	0,044		-2,783	0,006**

SDA	-0,018	0,018	-0,069	-1,017	0,310
PaR	-0,161	0,046	-0,184	-3,485	0,001**
Age	0,000	0,001	-0,025	-0,460	0,646
SA	0,007	0,022	0,024	0,341	0,733
Size	0,009	0,003	0,169	3,104	0,002**
Bank	0,020	0,016	0,068	1,274	0,203
NGO	0,009	0,008	0,070	1,204	0,230
EECA	0,045	0,011	0,259	4,072	0,000**
MENA	0,060	0,019	0,180	3,265	0,001**
Asia	0,007	0,012	0,038	0,623	0,534
LA	0,046	0,009	0,331	4,904	0,000**

Dependent variable: ROA

R^2: 0,209

F-test: 0,000

N: 349

**Significant at 5% level

*Significant at 10% level

5.4 Robustness regressions

Table 5-20, 5-21, 5-22 and 5-23 presents the results of the robustness regressions. I found that the results are consistent with the original OLS regressions, with a few exceptions;

In the robustness regressions for Model 1,2 and 5 I found the results to be consistent with the OLS regressions, but in addition I found that organization type dummy variable NGO has a statistically negatively significance at a 10 percent level to cost of funds

I found that short term debt to equity (SDE) has a statistically positively significance at a 10 percent level to cost of funds, in the robustness regressions for Model 3. Except for this I found the results to be the same as in the OLS regressions.

In the robustness regressions for Model 4 I found the results to be the same as in the OLS regressions, but in addition I found that the regional dummy variable MENA has a statistically positively significance at a 10 percent level to cost of funds.

I found that the regional dummy variable MENA has a statistically positively significance at a 5 percent level instead of 10 percent as in the OLS regression, in the robustness regressions for Model 6, other that I found the results to be the consistent with the OLS regressions.

In the robustness regressions for Model 7-12 I found the results to be the consistent with the OLS regressions, but in addition I found that the organizational type dummy variable Bank has a statistically positively significance at a 10 percent level.

This is the main difference in the robustness regressions in respect to the original OLS regressions, so as we can see most of the results are the same.

Table 5-20: Regression result from the COF Model (Robustness check of Model 1, 2 and 3)

	Model 1			**Model 2**			**Model 3**		
	$\widehat{\boldsymbol{\beta}}$	**t-value**	**p-value**	$\widehat{\boldsymbol{\beta}}$	**t-value**	**p-value**	$\widehat{\boldsymbol{\beta}}$	**t-value**	**p-value**
(constant)	0,030	0,91	0,364	0,034	0,95	0,344	0,029	0,87	0,383
PaR	0,008	0,22	0,830	0,004	0,11	0,913	0,007	1,18	0,857
Age	0,000	-0,80	0,422	0,000	-0,85	0,393	0,000	-0,68	0,495
SA	-0,041	-2,91	0,004**	-0,039	-2,79	0,006**	-0,044	-3,10	0,002**
Size	0,002	1,00	0,320	0,002	0,98	0,329	0,002	1,00	0,319
Bank	-0,011	-1.02	0,308	-0,011	-1,00	0,318	-0,012	-1,11	0,268
NGO	-0,010	-1,69	0,092*	-0,010	-1,70	0,089*	-0,009	-1,47	0,142
EECA	0,031	2,79	0,006**	0,030	2,73	0,007**	0,029	2,67	0,008**
MENA	0,015	1,23	0,221	0,015	1,26	0,209	0,015	1,24	0,215
Asia	0,032	3,60	0,000**	0,033	3,73	0,000**	0,032	3,69	0,000**
LA	0,033	4,33	0,000**	0,032	4,32	0,000**	0,031	4,15	0,000**
DE	5,249E-5	0,42	0,675						
LDE				-7,126E-5	-0,50	0,617			
SDE							0,001	1,89	0,060*
R^2:		0,114			0,112			0,115	
F-test:		0,000			0,000			0,000	
N		343			338			336	
Dependent variable: COF									
**Significant at 5% level									
*Significant at 10% level									

Table 5-21: Regression result from the COF Model (Robustness check of Model 4, 5 and 6)

	Model 4			Model 5			Model 6		
	$\widehat{\beta}$	t-value	p-value	$\widehat{\beta}$	t-value	p-value	$\widehat{\beta}$	t-value	p-value
(constant)	0,001	0,04	0,967	0,027	0,81	0,418	0,016	0,52	0,601
PaR	0,008	0,23	0,822	0,005	0,15	0,879	0,029	0,66	0,510
Age	0,000	-0,41	0,679	0,000	-0,81	0,420	0,000	-0,72	0,475
SA	-0,011	-0,69	0,490	-0,038	-2,60	0,010**	-0,089	-5,20	0,000**
Size	0,002	1,01	0,311	0,002	1,06	0,292	0,001	0,62	0,538
Bank	-0,011	-1,02	0,309	-0,011	-1,01	0,315	-0,012	-1,06	0,289
NGO	-0,009	-1,50	0,136	-0,010	-1,69	0,093*	-0,006	-1,10	0,274
EECA	0,032	2,95	0,003**	0,030	2,64	0,009**	0,039	3,70	0,000**
MENA	0,023	1,76	0,079*	0,015	1,23	0,219	0,026	2,28	0,024**
Asia	0,017	1,93	0,054*	0,029	2,85	0,005**	0,044	4,97	0,000**
LA	0,028	3,86	0,000**	0,032	4,15	0,000**	0,037	4,92	0,000**
DA	0,052	4,49	0,000**						
LDA				0,007	0,58	0,563			
SDA							0,073	4,89	0,000**
R^2:	0,167			0,113			0,187		
F-test:	0,000			0,000			0,000		
N	343			339			337		

Dependent variable: COF

**Significant at 5% level

*Significant at 10% level

Table 5-22: Regression result from the ROA Model (Robustness check of Model 7, 8 and 9)

	Model 7			Model 8			Model 9		
	$\widehat{\beta}$	t-value	p-value	$\widehat{\beta}$	t-value	p-value	$\widehat{\beta}$	t-value	p-value
(constant)	-0,126	-2,84	0,005**	-0,130	-2,97	0,003**	-0,126	-2,84	0,005**
PaR	-0,156	-2,62	0,009**	-0,157	-2,61	0,009**	-0,155	-2,61	0,009**
Age	0,000	-0,57	0,568	0,000	-0,53	0,597	0,000	-0,55	0,583
SA	-0,004	-0,22	0,827	-0,005	-0,31	0,758	-0,005	-0,24	0,809
Size	0,009	3,11	0,002**	0,009	3,20	0,002**	0,009	3,08	0,002**
Bank	0,019	1,69	0,093*	0,019	1,67	0,095*	0,020	1,72	0,087*

NGO	0,009	1,14	0,256	0,010	1,25	0,213	0,010	1,24	0,216
EECA	0,048	4,01	0,000**	0,048	3,97	0,000**	0,048	3,91	0,000**
MENA	0,063	3,76	0,000**	0,063	3,73	0,000**	0,063	3,76	0,000**
Asia	0,012	0,96	0,340	0,013	1,02	0,308	0,010	0,81	0,418
LA	0,047	4,75	0,000**	0,048	4,86	0,000**	0,047	4,74	0,000**
DE	0,000	-0,59	0,555						
LDE				0,000	-0,99	0,323			
SDE							-4,087E-5	-0,05	0,962
R^2:		0,204			0,209			0,206	
F-test:		0,000			0,000			0,000	
N		356			350			348	
Dependent variable: ROA									
**Significant at 5% level									
*Significant at 10% level									

Table 5-23: Regression result from the ROA Model (Robustness check of Model 10, 11 and 12)

	Model 10			**Model 11**			**Model 12**		
	$\widehat{\boldsymbol{\beta}}$	**t-value**	**p-value**	$\widehat{\boldsymbol{\beta}}$	**t-value**	**p-value**	$\widehat{\boldsymbol{\beta}}$	**t-value**	**p-value**
(constant)	-0,093	-2,25	0,025**	-0,109	-2,55	0,011**	-0,122	-2,80	0,005**
PaR	-0,155	-2,88	0,004**	-0,145	-2,42	0,016**	-0,161	-2,74	0,006**
Age	0,000	-0,95	0,345	0,000	-0,57	0,570	0,000	-0,54	0,588
SA	-0,048	-2,70	0,007**	-0,024	-1,41	0,160	0,007	0,34	0,731
Size	0,010	3,51	0,001**	0,009	3,15	0,002**	0,009	3,12	0,002**
Bank	0,020	1,97	0,050*	0,020	1,77	0,078*	0,020	1,78	0,075*
NGO	0,008	0,97	0,332	0,011	1,36	0,174	0,009	1,14	0,255
EECA	0,044	3,79	0,000**	0,052	4,34	0,000**	0,045	3,59	0,000**
MENA	0,051	3,11	0,002**	0,061	3,47	0,001**	0,060	3,61	0,000**
Asia	0,028	2,25	0,025**	0,034	2,45	0,015**	0,007	0,58	0,565
LA	0,052	5,30	0,000**	0,054	5,35	0,000**	0,046	4,62	0,000**
DA	-0,073	-4,84	0,000**						
LDA				-0,061	-3,64	0,000**			
SDA							-0,018	-0,90	0,369
R^2:		0,268			0,250			0,209	
F-test:		0,000			0,000			0,000	

N	356	351	349
Dependent variable: ROA			
**Significant at 5% level			
*Significant at 10% level			

5.5 Summary of the models

Table 5-24 shows the summary of the significance of the regression models, it also presents the hypotheses that were proposed in chapter 3. We can see that almost all of the hypothesis have the same directions as the actual results, but there are some deviations. The savings to asset ratio was expected to have a positive effect on the performance, instead the results shows that it has a negative effect in the financial performance of MFIs in this study.

Table 5-24: Summary of the regression models

Variable	On COF		On ROA		Hypothesis	
	Significance of $\hat{\beta}$	Direction	Significance of $\hat{\beta}$	Direction	COF	ROA
Independent variables						
DE		+		-	+	-
LDE		-		-	+	-
SDE		+		-	+	-
DA	Significant	+	Significant	-	+	-
LDA		+	Significant	-	+	-
SDA	Significant	+		-	+	-
Control variables						
PaR		+	Significant	-	-	-
Age		+		+	+	+
SA	Significant**	-	Significant****	-*	+	+
Size		+	Significant	+	+	+
Bank		-		+		
NGO		-		+		
EECA	Significant	+	Significant	+		

MENA	Significant***	+	Significant*****	+
Asia	Significant	+	Significant	+
LA	Significant	+	Significant	+

+ if the explanatory variable increases (decreases) then the dependent variable increases (decreases)

- if the explanatory variable decreases (increases) then the dependent variable increases (decreases)

*Except from in Model 12, where it is positive

**Except form in Model 4, where it is not significant

***Only significant in Model 6 at a 10 percent significance level

****Only significant in Model 10

*****Only significant in Model 10 and Model 11

6. CONCLUSION

6.1 Conclusion

This study examined the effect of capital structure on MFIs financial performance. The results of this study support some earlier finding, but also provide some new ones.

The regression results imply that there is a positively and significant relationship between total debt to assets and cost of funds. Further the short term debt to assets also have a positively and significant impact on cost of funds, which is consistent with the hypothesis. The ratios of total debt to equity, short term debt to equity and long term debt to assets all had a positive, but not significant effect in cost of funds. Long term debt to equity had a negative but not significantly effect on cost of funds, which is the opposite of what was suggested in the hypothesis.

The regression results where return on assets was used as a measure of performance only total debt to assets and long term debt to assets have a significant and negatively impact on return on assets. These results are consistent with the previous studies. Abor (2007) concluded that capital structure, especially long term and debt ratios have a negative effect on performance of SMEs. There have also been some other studies that have proved empirical evidence supporting this negative relationship between debt levels and ROA (Cassar & Holmes, 2003; Kyereboah-Coleman, 2007; Silva, 2008). The ratios of total debt to equity, long term debt to equity, short term debt to equity and short term debt to assets also have a negative effect on return on assets, but none of them are significant.

Savings to assets has a negative and significant effect on cost of funds in all of the regression models except from in Model 4, where debt to assets is used as a measure of capital structure. This is quite interesting because it is the opposite of what I had predicted in the hypothesis. Savings to assets also had a negative effect on return on assets, but it was not significant, except from in model 10 where debt to assets was used as a measure of capital structure.

Portfolio at risk showed a negative and significant impact on return on assets, this is consistent whit the hypothesis. According to the regression results portfolio at risk has a positive effect on cost of funds, but this relationship is not significant.

Size has a significantly positive effect on return on assets for all the regression models. It also has a positive effect on cost of funds, but this relationship is not significant.

6.2 Limitations and suggestion for new research

The findings of this study are mainly based on data collected from 403 MFIs in 73 countries. The data have a certain sample selection bias, because it only includes data from MFIs who willingly have agreed to expose their accounts for scrutiny and rating. Because of this it is important to be aware of the fact that there might be some differences between rated and non rated MFIs. There were also some missing data in the dataset, and some of the MFIs have been excluded from this study due to unusual and influential data. Even though all of the numbers in the dataset have been annualized and dollarized when needed by using official exchange rates at the given time, there is reason to believe that that accounting principles might be different from country to country and socio economic factors may influence the consistency of the data. To identify the effect of capital structure on MFIs performance multiple regression were applied. This regression analysis is only measuring the degree of relationship, and not the causes of the relationship. Most of the variables in the regression results have the same impact on the performance as suggested in the hypothesis, but unfortunately many of them are not significant, this might imply that the models are not so good. The low values of R^2 show that the spread around the regression line is quite high. But even though the R^2 values are low it may still result in statistically significant effect being detected in the regression model (Brooks, 2008).

The performance of MFIs can be measured in several ways and by a number of different variables, this study only used cost of funds and return on assets as performance measures of MFIs. So further studies could include more or different dependent variables, it would also be interesting to take a closer look at the effect different control variables have on the performance, for example savings.

REFERENCES

Abor, J. (2005). The effect of capital structure on profitability: an empirical analysis of listed firms in Ghana. [Article]. *Journal of Risk Finance (Emerald Group Publishing Limited), 6*(5), 438-445. doi: 10.1108/15265940510633505

Abor, J. (2007). Debt policy and performance of SMEs. [Article]. *Journal of Risk Finance (Emerald Group Publishing Limited), 8*(4), 364-379.

Anonymous. (2010). A better mattress. [Article]. *Economist, 394*(8673), 75-76.

Armendariz, B., & Labie, M. (2011). *The Handbook of microfinance*. Singapore: World Scientific Publishing Co.

Armendariz, B., & Morduch, J. (2010). *The economics of microfinance*. Cambridge, Mass.: MIT Press.

Balkenhol, B. (2007). *Microfinance and public policy: outreach, performance and efficiency*. Geneva: International Labour Office.

Beisland, L. A., & Mersland, R. (2012). An Analysis of the Drivers of Microfinance Rating Assessments. [Article]. *Nonprofit & Voluntary Sector Quarterly, 41*(2), 213-231. doi: 10.1177/0899764011433616

Berger, A. N., & Bonaccorsi-diPatti, E. (2006). Capital structure and firm performance: a new approach to testing agency theory and an application to the banking industry. *Journal of Banking and Finance, 30*(4), 1065-1102.

Berk, J., & DeMarzo, P. (2007). *Corporate finance*. Boston: Pearson/Addison Wesley.

Boateng, A. (2004). Determinants of Capital Structure: Evidence from International Joint Ventures in Ghana. *International Journal of Social Economics, 31*(1-2), 56-66. doi: http://www.emeraldinsight.com/ijse.htm

Bogan, V. (2009). Capital Structure and Sustainability: An Empirical Study of Microfinance Institutions.

Brooks, C. (2008). *Introductory Econometrics for Finance* (second ed.): Cambridge University Press.

Brunin, J. (2006a). SPSS Web Books, Regression Diagnostics Retrieved 10.11, 2012, from http://www.ats.ucla.edu/stat/spss/webbooks/reg/chapter2/spssreg2.htm

Brunin, J. (2006b). Stata Data Analysis Examples, Robust Regression Retrieved 10.11, 2012, from http://www.ats.ucla.edu/stat/stata/dae/rreg.htm

Cassar, G., & Holmes, S. (2003). Capital structure and financing of SMEs: Australian evidence. [Article]. *Accounting & Finance, 43*(2), 123-147. doi: 10.1111/1467-629X.t01-1-00085

CGAP. (2003). Performance Indicators for Microfinance Institutions.

CGAP. (2006). Good Practice Guidelines for Funders of Microfinance. *2nd edition*.

CGAP. (2007). MFI Capital Structure Decision Making: A Call for Greater Awareness.

CGAP. (2009). Efficiency Drivers of MFIs: The Role of Age.

CGAP. (2012). Who Are the Clients of Microfinance? Retrieved 05.04, 2012, from http://www.cgap.org/p/site/c/template.rc/1.26.1304/

Champion, D. (1999). Finance: the joy of leverage. *Harvard Business Review, 77*(4), 19-22.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied Multiple Regression/Correlation Analysis for the Behavioral Siences*: Lawrence Erlbaum Associates, Publishers.

Eikemo, T. A., & Clausen, T. H. (2007). *Kvantitativ analyse med SPSS, En praktisk innføring i kvantitative analyseteknikker*: Tapir Akademiske Forlag.

Fama, E. F., & French, K. R. (1998). Taxes, Financing Decisions, and Firm Value. *Journal of Finance, 53*(3), 819-843. doi: http://www.blackwellpublishing.com/journal.asp?ref=0022-1082

Gateway, M. (2012). What is Microfinance? Retrieved 05.04, 2012, from http://www.microfinancegateway.org/p/site/m/template.rc/1.26.12263/#1

Gill, A., Biger, N., & Mathur, N. (2011). The Effect of Capital Structure on Profitability: Evidence from the United States. [Article]. *International Journal of Management, 28*(4), 3-15.

Gleason, K. C., Mathur, L. K., & Mathur, I. (2000). The Interrelationship between Culture, Capital Structure, and Performance. Evidence from European Retailers. [Article]. *Journal of Business Research, 50*, 185-191. doi: 10.1016/s0148-2963(99)00031-4

Grossman, S. J., & Hart, O. D. (1982). Corporate Financial Structure and Managerial Incentives. In J. McCall (Ed.), *The Economics of Information and Uncertainty* (pp. 211-241). Chicago: University of Chicago. (Reprinted from: [1982]).

Hadlock, C. J., & James, C. M. (2002). Do Banks Provide Financial Slack? *Journal of Finance, 57*(3), 1383-1419. doi: http://www.blackwellpublishing.com/journal.asp?ref=0022-1082

Hamada, R. S. (1969). Portfolio analysis market equilibrium and corporation finance *The Journal of Finance, 31*(1), 13-31.

Harris, M., & Raviv, A. (1990). Capital structure and the informal role of debt. *The Journal of Finance, 45*(2), 321-349.

Helms, B. (2006). Access for all: building inclusive financial systems (pp. xii, 170 s.).

Hutchinson, R. W. (1995). The Capital Structure and Investment Decisions of the Small Owner-Managed Firm: Some Exploratory Issues. *Small Business Economics, 7*(3), 231-239. doi: http://www.springerlink.com/link.asp?id=100338

Investopedia. (2012). Cost of funds, from http://www.investopedia.com/terms/c/costoffunds.asp#axzz1tstLq2DF

Jacobsen, D. I. (2005). *Hvordan gjennomføre undersøkelser? Innføring i samfunnsvitenskapelig metode*: Høyskoleforlaget AS.

Jensen, & Langemeier. (1996). Optimal Leverage with Risk Aversion: Empirical Evidence. *Agricultural Finance Review, 56*, 85-97.

Jensen, M. C. (1986). Agency cost of free cash flow, corporate finance and takeovers. *American Economic Review, 76*(2), 323-339.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: managerial behaviour, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305-360.

Kyereboah-Coleman, A. (2007). The impact of capital structure on the performance of microfinance institutions. [Article]. *Journal of Risk Finance (Emerald Group Publishing Limited), 8*(1), 56-71.

Ledgerwood, J. (1999). Microfinance handbook: an institutional and financial perspective (pp. xvi, 286 s.).

Ledgerwood, J., & White, V. (2006). Transforming microfinance institutions: providing full financial services to the poor (pp. xlviii, 517).

Long, M. S., & Malitz, I. B. (1985). Investment patterns and financial leverage In B. M. Friedman (Ed.), *Corporate Capital Structures in the United States* (pp. 325-352): University of Chicago Press.

Majumdar, S. K., & Chhibber, P. (1999). Capital Structure and Performance: Evidence from a Transition Economy on an Aspect of Corporate Governance. *Public Choice, 98*(3-4), 287-305. doi: http://www.springerlink.com/link.asp?id=100332

Mersland, R. (2011). Explaining the dataset. University of Agder.

Mersland, R., Randøy, T., & Strøm, R. Ø. (2011). The impact of international influence on microbanks' performance: A global survey. *International Business Review, 20*, 163-176.

Mersland, R., & Strøm, R. Ø. (2009). Performance and governance in microfinance institutions. [Article]. *Journal of Banking and Finance, 33*, 662-669. doi: 10.1016/j.jbankfin.2008.11.009

Mersland, R., & Strøm, R. Ø. (2010). Microfinance Mission Drift? [Article]. *World Development, 38*, 28-36. doi: 10.1016/j.worlddev.2009.05.006

Meyer, R. L. (2002). Track Record of Financial Institutions in Assisting the Poor in Asia.

MicroRate, & InterAmericanDevelopmentBank. (2003). Performance Indicators for Microfinance Institutions (3 ed.). Washington D.C.

Miller, M. H., & Modigliani, F. (1958). The cost of capital, corporation finance and the theory of investment *The American Economic Review, 48*(3), 261-297.

Miller, M. H., & Modigliani, F. (1966). Some estimates of the cost of capital to the electric utility industry. *The American Economic Review, 56*(3), 333-391.

Myers, S. C. (1977). The determinants of corporate borrowing. *Journal of Financial Economics, 5*(2), 147-175.

Myers, S. C. (2001). Capital Structure. *Journal of Economic Perspectives, 15*(2), 81-102.

Myres, S. C. (1984). The capital structure puzzle. *Journal of Finance, 39*(3), 575-592.

Navajas, S., Schreiner, M., Meyer, R. L., Gonzalez-vega, C., & Rodriguez-meza, J. (2000). Microcredit and the Poorest of the Poor: Theory and Evidence from Bolivia. [Article]. *World Development, 28*, 333-346. doi: 10.1016/s0305-750x(99)00121-7

Pallant, J. (2007). *SPSS Survival Manual* (3 ed.): Open University Press.

Rao, N. V., Al-Yahyaee, K. H. M., & Syed, L. A. M. (2007). Capital Structure and Financial Performance: Evidence from Oman. *Indian Journal of Economics and Business, 6*(1), 1-14. doi: http://www.ijeb.com

Razali, N. M., & Wah, Y. B. (2011). Power comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lillefors and Anderson-Darling tests. *Journal of Statistical Modeling and Analytics, 2*(1), 21-33.

Robinson, M. S. (2001). *The microfinance revolution*. Washington, D.C.: World Bank.

Roden, D. M., & Lewellen, W. G. (1995). Corporate Capital Structure Decisions: Evidence from Leveraged Buyouts. [Article]. *The Journal of the Financial Management Association, 24*(2), 76-87.

Rosenborg, R. (2009). Measuring resilts of microfinance institutions-minimum indicators that donors and investors should track. In CGAP (Ed.). Washington.

Silva, M. W. S. S. (2008). *The effect of capital structure on microfinance institutions performance.* Master's thesis, University of Agder, Kristiansand.

Simons, R. (2000). *Performance Measurement & Control Systems for Implementing Strategy*: Prentice Hall Upper Saddle River, New Jersy 07458.

Stiglitz, J. E. (1974). On the irrelevance of corporate finance policy. *The American Economic Review, 64*(6), 851-866.

Studenmund, A. H. (2011). *Using econometrics: a practical guide*. Boston: Pearson.

Taub, A. J. (1975). Determinants of the frim's capital structure. [Article]. *Review of Economics & Statistics, 57*(4), 410-416.

Titman, S., & Wessels, R. (1988). The determinants of capital structure choise. *The Journal of Finance, 43*(1), 1-19.

Wedig, G., Sloan, F. A., Hassan, M., & Morrisey, M. A. (1988). Capital Structure, Ownership, and Capital Payment Policy: The Case of Hospitals. [Article]. *Journal of Finance, 43*(1), 21-40.

Williams, J. (1987). Perquisites, risk and capital structure. *The Journal of Finance, 42*(1), 29-49.