Aalto University
School of Business

TRADE-OFF BETWEEN PROFITABILITY AND POVERTY OUTREACH IN THE MICROFINANCE INDUSTRY DEPENDING ON THE INSTITUTION TYPE

Finance

Master's thesis

Hanna Hovi

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Department of Finance
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Abstract
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PURPOSE OF THE STUDY: The thesis studies the trade-off between profitability and poverty outreach in the microfinance industry depending on the institution type. There are only few studies about the tradeoff even though there is a lot of discussion around it in the literature. The effect of the institution type (banks, non-bank financial institutions, cooperatives and non-governmental organizations) on that equation has not been studied before even though it has a large impact on both profitability and outreach. The main purpose is to find out whether institutions can achieve highly profitable operations at the same time with large poverty outreach. The study also investigates whether the effect varies between the different institution types.

DATA: The thesis uses a large data set and multiple years' panel data analyses of leading microfinance institutions. The study is conducted by using data of 795 institutions around the world and spanning over the years 1995-2011. I use random effects estimator with White's robust standard errors and linear combination tests. In addition, I proceed with oneway ANOVA tests and Bonferroni, Scheffe, and Sidak multiple comparison tests to study the differences between institution types more closely.

RESULTS: Profitability of the institution can be improved firstly by cutting the costs and secondly by increasing the interest rates. Banks and cooperatives are more profitable institution types. More commercialized and profit oriented institutions, especially banks, are more sensitive to changes in interest rates and cost structures. Based on my results, there is no clear tradeoff between profitability and poverty outreach. It is possible to achieve both profitability and the large poverty outreach but the results vary depending on the institution type. Banks and cooperatives suffer less on the trade-off between profitability and outreach. The main reason why the banks and cooperatives are able to achieve both of the targets is their cost effective operations.

KEY WORDS: Microfinance, Trade-off, Mission drift, Operational self-sufficiency, Institution type, Outreach

Aalto-yliopiston kauppakorkeakoulu
Pro Gradu –tutkielma
Hanna Hovi

Tiivistelmä
6. marraskuuta, 2012

SUHDE KANNATTAVUUDEN JA KÖYHIEN SAAVUTTAMISEN VÄLILLÄ MIKRORAHOITUSMARKKINOILLA RIIPPUEN INSTITUUTIORAKENTEESTA

TUTKIELMAN TAVOITTEET: Tutkielman tarkoituksena on selvittää suhdetta mikrorahoitusinstituution kannattavuuden sekä köyhien saavuttamisen välillä riippuen instituutiorakenteesta. Kyseistä suhdetta on tutkittu vain vähän, vaikka sen ympärillä onkin paljon keskustelua kirjallisuudessa. Instituutiorakenteen (pankki, muu rahoitusyhtiö, osuuskunta tai kansalaisjärjestö) vaikutusta ei ole tutkittu aikaisemmin tähän yhtälöön liittyen, vaikka se vaikuttaa suuresti sekä kannattavuuteen sekä instituution mahdollisuuksiin saavuttaa kaikkein köyhimpiä. Tutkimukseni pääasiallinen tarkoitus on selvittää, voivatko instituutiot olla kannattavia ja samaan aikaan saavuttaa kaikkein köyhimpiä ihmisiä, ja miten tämä riippuu instituutiorakenteesta.

LÄHDEAINEISTO: Tutkielma perustuu paneelidata-analyysiin, jossa käytetään usean vuoden aineistoa johtavilta mikrorahoituslaitoksilta. Aineisto kattaa vuodet 1995-2011 ja sisältää 795 instituutiota eri puolilta maailmaa. Toteutan tutkimukseni käyttäen satunnaisten vaikutusten estimaattorimallia hyödyntäen Whiten robusteja keskivirheitä. Tämän lisäksi teen ANOVA- testin sekä Bonferroni, Scheffe ja Sidak –vertailun tutkiakseni instituutiorakennetta tarkemmin.

TULOKSET: Mikrorahoituslaitosten kannattavuutta voidaan parantaa ensinnäkin leikkaamalla kustannuksia ja toiseksi nostamalla korkoja. Pankit ja osuuskunnat ovat kannattavimpia instituutioita. Kaupallistuneet ja kannattavuutta tavoittelevat instituutiot, erityisesti pankit, ovat herkempiä korkotason ja kustannusrakenteen muutoksille verrattuna muihin instituutioihin. Tulosteni perusteella on mahdollista sekä harjoittaa kannattavaa toimintaa että saavuttaa suuri määrä köyhiä. Tulokset kuitenkin vaihtelevat instituutiorakenteen mukaan. Pankit ja osuuskunnat pystyvät saavuttamaan molemmat tavoitteet muita instituutioita paremmin. Syy tähän on, että pankeilla ja osuuskunnilla on kustannustehokkaimmat operaatiot.

AVAINSANAT: Mikrorahoitus, mikrorahoituslaitos, kannattavuus, instituutiorakenne

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1. Introduction

1.1. Background and motivation

Microfinance industry has grown remarkably in recent years. Compound average growth rate for number of borrowers has been 21 % and for gross loan portfolio 34 % during 2003-2008 (Gonzales, 2009). Based on the United Nations (2005) definition microfinance can be expressed as "the sustainable supply of small-scale financial services such as credit, savings accounts, and insurance to poor and low income people". Mersland and Strøm (2009) have defined the mission of the microfinance institutions as to provide banking services to the poor which means lending very small sums to very poor borrowers. Schreiner (2002) states that almost all the microfinance practitioners agree that the goal is to improve the welfare of the poor. The more controversial topic is how to best achieve this goal. Microfinance can be seen as a poverty alleviation tool that has potential to become a self-sustaining industry.

At the moment, one of the most complicated and a crucial issue in the microfinance industry is the trade-off between profitability and poverty outreach of the institutions. Is it possible to achieve both goals or should microfinance institutions decide which one to aim at? Armendáriz and Morduch (2010) state, in the introductory paragraph in one of the most comprehensive textbooks about the economics of microfinance, that "if there is one unresolved tension that animates those who spend their days working on microfinance, it entails how to navigate the trade-offs between maximizing social impact and building strong, large financial institutions. It is a healthy tension, but an inescapable one".

Ongoing debate between profitability and outreach disputes whether microfinance could be a profit generating and self-sufficient industry or does it need to be subsidized to ensure outreach to the poorest of the poor that may need microfinance more than any other group. One party claims that microfinance institutions should try to be self-sufficient and be able to function without enormous amounts of subsidies from the third parties. The argument stems from the idea that MFIs should become financially self-sufficient institutions that can borrow from the commercial capital markets and serve large number of poor people. The concern of the opponents is that the profit-seeking approach would leave poorest of the poor discarded and therefore not contribute enough to the poverty alleviation goal.

In my thesis, I study if there is a trade-off between being profitable and reaching the poorest or could the institutions reach both targets at the same time. There have been few studies about the topic using large data sets even though there is a lot of discussion in the literature around profitability and outreach. The earlier findings in the outreach and profitability trade-off field are inconclusive. For example Mosley (1996); Mosley and Holme (1998); Galema and Lensink (2009); and Hermes et al. (2011) found supporting evidence that trade-off would exist. On the other hand for example Gonzales and Rosenberg (2006); Cull et al. (2007); Hishigsuren, 2007; Mersland and Oysten (2010); Mersland and Strøm (2010) and Quayes (2012) indicate that both profitability and outreach could be achieved at the same time depending on the situation. I have conducted my study with newer and larger data sets compared to the earlier trade-off investigations. Studies with newer data are necessary since the microfinance industry has developed significantly during the past ten years. Cull et al. (2007) is one of the few solid studies in the field but is conducted with the simple ordinary least squares model as many earlier researches. Nevertheless, I find out that the regression may not be linear and panel data regression could provide more accurate estimates. I am able to bring new insight into studies by multi-year panel data regression with the large data set from all around the world.

Other niche for my study is the effect of the institution type (banks, non-bank financial institutions, cooperatives and non-governmental organizations) on the trade-off equation. Institution type has not been studied comprehensively in this context even though it has a large impact on both profitability and outreach. More commercialized institutions, such as banks, are often chasing profitability more eagerly compared to for example non-governmental organizations. Therefore I investigate whether some of the institutions sacrifice their outreach more than others while aiming to profitable operations. I also investigate reason behind profitability and outreach functions of the different institution types to see the root causes causing differences in the tradeoff equation.

To sum up, there is a lack of recent cross-country investigations that would show whether aiming to profitability has an effect on outreach of the institutions. My motivation is to study the trade-off equation with the larger and newer data set and provide updated and accurate recommendations. In addition, I investigate how the institution type effects on that tradeoff equation. The topic is relevant at the moment because there seems to be a shift from subsidizing MFIs to a focus on financial sustainability and efficiency of these institutions (Hermes et al., 2011).

1.2.The research question and methodology

The main objective *is to study tradeoff between profitability and poverty outreach in the microfinance industry and how institution type effects on that equation.*

In my thesis, I first study the profitability function of the institution. Profitability is affected by the cost structure of the institution and by the changes in interest rates through asymmetric information problems. After studying profitability, I move on to my main issue about the trade-off between profitability and outreach in the microfinance industry. The purpose is to find if poverty outreach decreases while microfinance institutions aim to become more profitable. Finally I want to explore the differences in effects based on the institution types. My three research questions are following:

Q1: What are the main drivers behind the profitability function of the institution?

Q2: Can institutions achieve both high profitability and the large outreach to the poor?

Q3: How does the institution type effect on the profitability and poverty outreach of the institution?

In my thesis, I use large 15-years' data sets of leading microfinance institutions. The data is collected from the MixMarket which is a commonly used information source to get accurate data on microfinance industry. My data consists of 795 institutions from 89 different countries. I have included only high quality data and use panel data regressions to be able to conduct as accurate analyses as possible. I have six separate equations and report results from random effects regression with White's robust standard errors. I also run the linear combinations tests to get more accurate results for different institution types. In addition, I run oneway ANOVA tests and Bonferroni, Scheffe, and Sidak multiple comparison tests to investigate the differences between institution types. Based on that, I am able to provide new insight about institution specific differences in regards the trade-off between profitability and outreach in the microfinance industry.

1.3. Main findings

First finding from my study is that the interest rates and cost drivers cause differences in profitability of the institution. Cost cutting and the more efficient operations have even larger impact on profitability and therefore focus should be directed to improve the operational

efficiency of microfinance institutions. Also setting the interest rates at an appropriate level is critical for profitability. Rising interest rates up to very high levels damages the profitability due to asymmetric information problems that cause decreased portfolio quality.

After understanding the profitability side, I proceed to the outreach equations. The main contribution of my study shows that there is no clear trade-off between profitability and outreach. It is possible to achieve both profitability and poverty outreach and this seems to be true especially for the banks and cooperatives. The finding should have an impact on the regulation, donors and practitioners of microfinance. Based on my results, commercialization does not necessarily decrease outreach. Commercialization brings often more efficient operations, scale economies and opportunities to reach larger populations. Therefore, aiming to higher profitability should be supported in many areas of microfinance. My results also suggest that trade-off is not larger while institutions grow and mature. Therefore so called mission drift effect would not exist in a large scale. The contribution to the literature is relevant, because researches with large and accurate datasets have been missing.

Regarding the institution types, I found significant effect of institution type on both profitability and outreach of the institution. Banks and cooperatives are the most profitable institution types. More commercialized and profit oriented institutions, such as banks, are much more affected by the negative effect of rising interest rates to high levels. They also benefit more on the relatively high personnel costs representing ability to capitalize the investments in personnel of the institution. In regards the outreach equations, cooperatives and banks actually suffer less on the trade-off between profitability and poverty outreach. This is mostly due to their cost effective operations. Seeking for profitability does not necessarily decrease the outreach of the institution and therefore it could be supported in the microfinance industry.

1.4. Key definitions

Table 1
Key definitions

Term	Definition
Microfinance	The provision of small-scale financial services such as savings, credit and other basic financial services to poor and low-income people (United Nations).
MFI	Refers to microfinance institutions including wide range of organizations dedicated to provide microfinance services. MFIs include non-governmental organizations, credit unions, cooperatives, private commercial banks, non-bank financial institutions and state-owned banks.
Trade-off between profitability and outreach	MFIs may not be able to serve the poorest of the poor when trying to achieve high profitability.
Microfinance mission drift	MFIs may drift from their mission to serve the poorest of the poor while they grow and mature. Mission drift is not clear evident term because it includes the motivations and incentives that may lead to trade-off between profitability and poverty outreach.
Microfinance banks (Bank)	Usually licensed financial intermediaries regulated by a state banking supervisory agency. They may provide a number of financial services, including deposit taking, lending, payment services, and money transfers.
Non-bank financial institutions (NBFI)	Shareholder owned firms that provide similar services to those of banks, but are licensed under a separate category.
Cooperatives and credit unions (Coop)	Registered under a country's cooperative law or are included as a special category in the banking law, but may lack effective external supervision or authorizing legislation. They are member-based financial intermediaries and may offer a range of financial services, including lending and deposit taking, for the benefit of its members.
Non-governmental organizations (NGO)	Organizations registered as a nonprofit for tax purposes or some other legal charter. The financial services of NGOs are usually more restricted and do not usually include deposit taking. These institutions are typically not regulated by a banking supervisory agency.

1.5. Limitations of the study

The largest limitations for my study are set by the availability of the data leading to the potential selection bias. I have used the data from MixMarket which is the largest microfinance database in the world. MFIs that are included into the database need to have adequate information infrastructure to be able to provide necessary data. This leads into the conclusion that MixMarket database probably represents a random sample of the best

managed MFIs in the world. I have used only data by the highly ranked MFIs to ensure appropriateness of the data but this biases my sample even further. However, it seems that these best managed MFIs are providing services for majority of the microfinance clients. In addition, as Mersland and Strøm (2008) explain, the more realistic comparison between institution types is possible, while very small MFIs - without intention to apply microfinance in a business-like manner - are left out from my sample. In regardless of the limitations, the data is commonly accepted and gives a good representation of the microfinance industry.

1.6. Structure of the thesis

In the Chapter 2, I first go through the microfinance literature and the reasons for existence of microfinance industry. Following to that, I introduce the basic theoretical background for microfinance trade-off between profitability and outreach in the Chapters 3. In the Chapter 4, I go through the impact of the institution type followed by the synthesis of the literature review in the Chapter 5. I start the empirical analyses by introducing the hypotheses and the empirical methodology in the Chapters 6 and 7. Following to that, I present the findings and robustness checks for my empirical research. In the Chapter 9 and 10, I recap the results, suggest some future research topics and conclude my thesis.

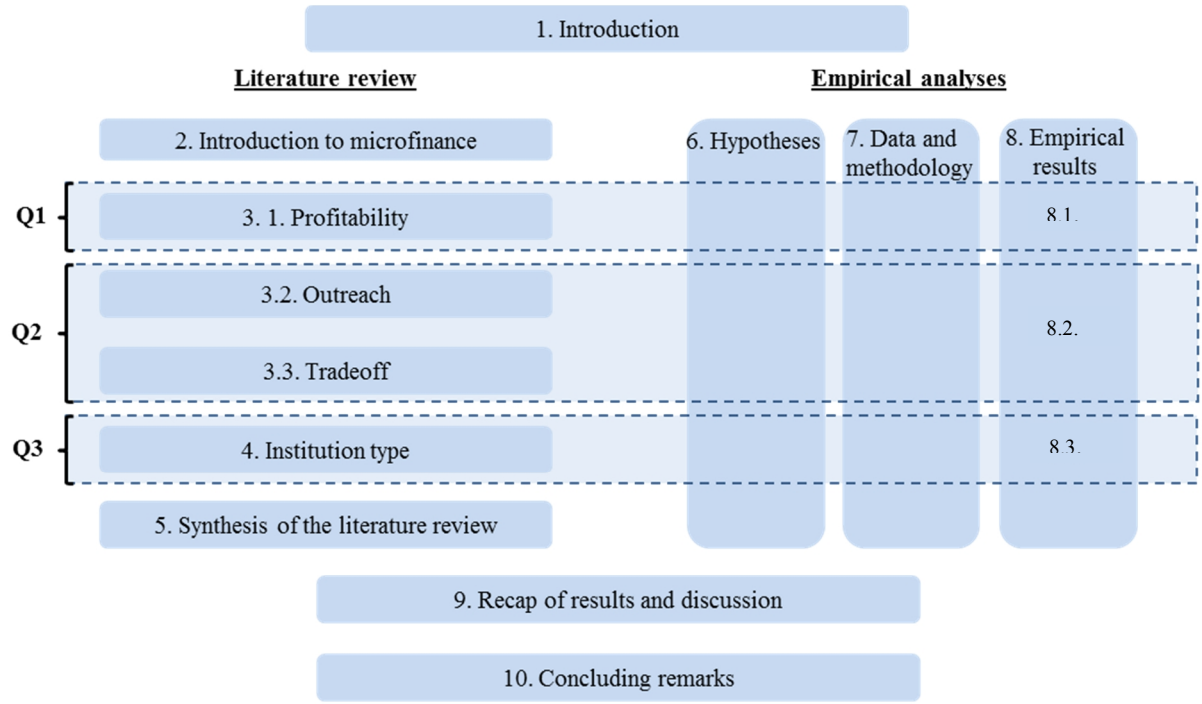

Figure 1
Structure of the thesis

2. Introduction to microfinance

2.1. Reasons for and development of microfinance industry

Microfinance practitioners aim to achieve the ultimate goal of poverty reduction by providing poor people access to financial services. The Millennium Development Goals set globally-adopted targets to reduce extreme poverty by half by 2015 (United Nations, 2011). Microfinance is one of the most effective ways to answer to the poverty reduction challenge by providing the access to finance for the poorest of the poor. Microfinance can be defined as a provision of diverse financial services (credit, savings, insurance, money transfers, and other financial services) to poor and low-income clients (CGAP, 2010).

The global outreach of microfinance has increased tremendously over the past 30 years. Maes and Reed (2012) find out that 3652 MFIs reported reaching over 200 million clients in 2010. They also state that the number of very poor families with a microloan has grown more than 18-fold from 7.6 million in 1997 to 137.5 million in 2010. Practitioner's goal is to reach 175 million poor and low income people by 2015 (Armendáriz and Morduch, 2010). The impact of microfinance is even larger than the direct client numbers. When including on average five family members that are affected through access to credit, Maes and Reed (2012) conclude that microfinance reaches approximately 687 million poor and low-income people worldwide. There are different views of the size of the microfinance market, because most data sources are based on self-reporting (Rhyne and Otero, 2006) and different kind of institutions are included into the studies. The findings of Maes and Reed (2012) are from the Microcredit Summit, which is one of the largest databases for microfinance information. Other commonly referred source for microfinance data is MIX market which excludes large self-help groups and government-run programs (Rhyne and Otero). Therefore the numbers are relatively lower compared to Microcredit Summit. In the MIX analyses, Gonzalez (2009) finds out that the annual compound average growth rate for the number of borrowers has been 21 % in 2003-2008. An annual compound average growth rate for gross loan portfolio has been 34 % during these years. With these growth rates, the microfinance has a potential to meet the growing demand for financial services in the developing world.

The need for microfinance is derived from the lack of financial services for the poor. Access to financial services or outreach of the financial system has become a major concern for many policymakers in developing countries. Given that almost 3 billion people live on less than two

dollars a day in developing countries, it is clear that the amount of microfinance at the moment is not anywhere close to its full potential and there is a huge unmet demand for financial services by the poor (United Nations, 2011). There are still the estimated 2.7 billion people around the world that do not use formal financial services (CGAP 2010). Cull et al. (2009) introduce the estimate that roughly 40 to 80 percent of the populations in the most developing economies lack access to formal banking services. Demirgüç-Kunt and Klapper (2012) introduce even lower numbers in their region specific study presented in Figure 1. While financial services are nearly universal in high-income economies, with 89 percent of adults reporting that they have an account at a formal financial institution, it is only 41 percent in developing economies. Even though microfinance has broadened access to finance for hundreds of millions of low income people who lack ready access to formal financial services (Cull et al., 2009), there is still huge demand to meet in the future.

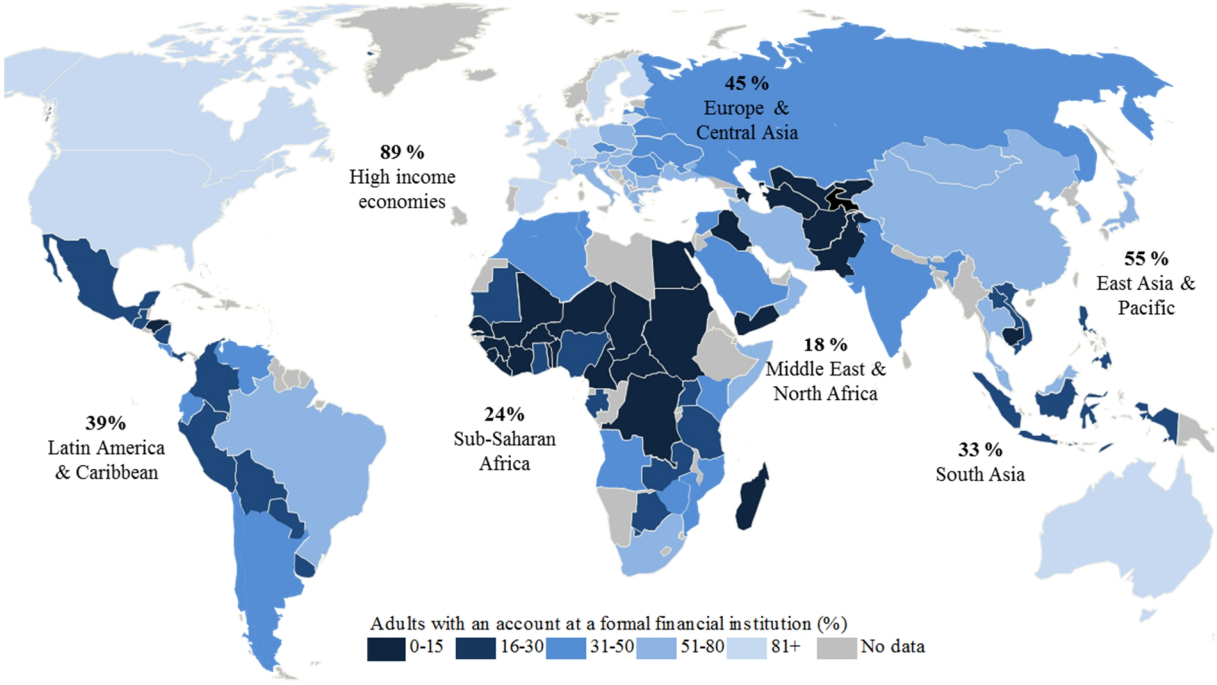

Figure 2
Account penetration around the world
The figure shows the percentage of adults that have an account at a formal financial institution in the different regions.
Source: Demirgüç-Kunt & Klapper (2012)

Microfinance is rooted from the 19th century credit unions. Already those credit unions used joint-liability lending - one of the basic innovations in microfinance industry - that provides high repayment rates at affordable interest rates. In these unions, the villagers were linked by a "common bond" and there were a threat of stigma or social sanction preventing individuals

from defaulting. As an industry, microfinance started to develop in the 1970s after the realization that poor households can be reliable banking customers. In the beginning, there were substantial subsidies and institutions were costly and inefficient and mostly focused on farmers. In the 1980s the focus turned towards people in villages and towns running nonfarm enterprises (Cull et al., 2009). This enabled many advantages for microfinance industry because non-farmers were less vulnerable to weather or crop price changes and their income was more regular. At that time, the top microloan providers achieved repayment rates of 98 % and opened more room to develop microfinance that could someday work in a profitable way. In the 1980s and 1990s policy makers started to argue that MFIs should be profitable and financially sustainable.

Nowadays, microfinance institutions are commonly divided to poverty lending approach institutions and financial system approach institutions (Hermes and Lensink, 2011). One of the most researched and successful poverty lending approach microfinance institutions has been Grameen Bank of Bangladesh based on the idea of Muhammad Yunus. It received the Nobel Peace Prize 2006 and introduced the group lending methods to the wide audience. The methodology was later replicated in many MFIs around the world. The basic idea was that microfinance can unleash the productivity of cash-starved entrepreneurs and raise their incomes above poverty lines (Cull et al., 2009). The working model in the Grameen Bank has been that two members of each five-person group receive their loan first. If all installment are paid on time, the initial loans are followed four to six weeks later by loans to two other members, and then, after another four to six week, by a loan to the group chairperson (Armendáriz and Morduch, 2005). The groups are therefore the sources of solidarity that are offering mutual assistance in times of need. Grameen Bank is seen as a model example of MFI using poverty lending approach.

When considering institutions that have adopted the financial systems approach, two most famous institutions are BancoSol in Bolivia and Banco Compartamos in Mexico. BancoSol has achieved profits through extremely high interest rates which has aroused some criticism among the microfinance commercialization criticizers. Ylinen (2010) explains that BancoSol was the first nonprofit MFI to transform itself into a private, commercial microfinance bank. Banco Compartamos, on the other hand, conducted public stock offering in April 2007. The offering provided impressive returns to equity investors to their early investments and at the same time charged very high interest rates. The strategy entailed charging high interest rates to generate retained earnings that could fuel rapid expansion. These strategies have aroused

some criticism but on the other hand, the commercialized banks have been able to reach large number of poor customers while making the profit to shareholders.

To be able to understand the trade-off between profitability and outreach, it is important to first understand that for what microfinance is needed. What does microfinance give that traditional and older ways of financing would not be able to deliver? Armendáriz and Morduch (2010) start their reasoning from the basic economic theory of diminishing marginal returns to capital. Based on the theory, the capital should flow from the rich people to poor people, because marginal return to capital is much larger for the poor people. Based on the concave production function, one could think that marginal return for poor entrepreneurs would be higher and based on that theory; the capital should flow from rich to poor. This is due the fact that in the lower levels, the marginal output from the initial investment (e.g. buying the first production machine) is greater than the later investments. Sophisticating the processes increases profitability less compared to initial investments. If the theory would truly hold, microfinance would not be needed, because capital flows could be ensured by other means. In reality though, the production function may not be concave and due to differing complementary inputs, poorer entrepreneurs may have lower marginal returns despite having less capital. In addition, poorer entrepreneurs may have no opportunities for scale economies which mean that poorer entrepreneurs would have even lower marginal returns despite having less capital (Armendáriz and Morduch, 2010). In reality the theory of diminishing marginal return to capital does not hold due to information asymmetry problems such as moral hazard and adverse selection.

The most important reason for existence of microfinance is therefore market failures that stem from the poor information, high transaction costs and difficulties enforcing contracts (Armendáriz and Morduch, 2010). Due to information asymmetry problems and lacking collaterals, it is more expensive to provide large scale of small loans and find all the necessary information instead of providing couple of large loans. Microfinance presents itself as an answer to these problems and a way to overcome the vicious circle by reducing transaction costs and overcoming information problems. It challenges long-held assumptions about what poor households can and cannot achieve and more broadly, shows the potential for innovative contracts and institutions to improve conditions in low-income communities. As Armendáriz and Morduch (2010) explain, state-owned development banks failed to achieve sustainable poverty reduction largely because the resources were mismanaged and interest rate restrictions prevented banks from operating viably in poor areas. Microfinance has potential

to answer to these issues, avoid the mistakes that state-owned banks previously made and create sustainable ways to reduce poverty.

Relevance of the microfinance can be best judged based on the alternatives that would exist instead of microfinance industry. Armendáriz and Morduch (2010) explain that the options for microfinance would be the formal banking sector lending or the informal channels of lending. Both of these channels exist at the moment. In formal banking sector there are several problems arousing from adverse selection and moral hazard that lead to a situation where raising interest rates can exacerbate incentive problems in lending. This can reduce the profits for banks working in poor communities, imposing the major bind on commercial banks trying to expand access. Without adding new measures to retain good incentives (e.g. what microfinance generally provides) commercial banks naturally avoid places where the operating costs are high and the collaterals scarce. In addition to formal banks, the informal lending is another extremity. For ages, poor people have been able to borrow, but only from the informal sector such as neighbors, relatives and local traders. These providers have large amount of information but not enough capital. Invention behind microfinance is trying to combine the best sides from the both of the traditional ways. Microfinance aims to capitalize local information from the informal channels and bring in resources outside the community. It is still important to remember that in the developing world, formal banking sector amounts less than 10 % of the total lending as seen in the Figure 2. There is a room for microfinance institutions and banks to expand in the developing world.

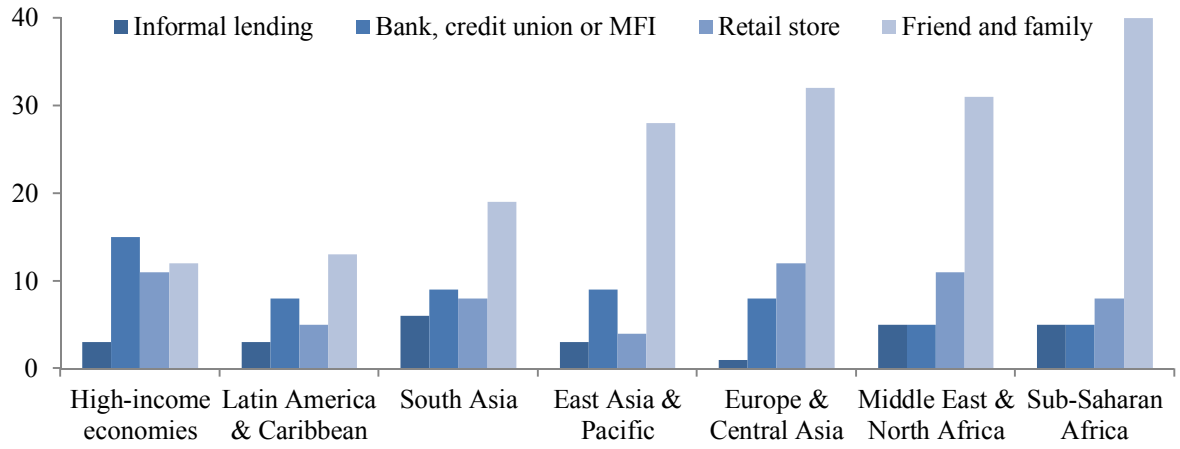

Figure 3
Sources of new formal and informal loans in the year 2011
The figure shows the percentage of adults borrowing from the different sources in the year 2011. As seen, formal banks are less than 10 % of the total lending in the developing regions. Friends and family are the most important lending channels in the developing world.
Source: Demirgüç-Kunt & Klapper (2012)

Microfinance has been in a revolution in the recent years. Increased competition has caused lower interest rates, lower costs, more efficiency and the introduction of new financial services. In addition commercialized banks have become interested in microfinance industry (Hermes et al. 2011). There has been a recent paradigm shift in microcredit industry, from subsidized credit delivery programs to financially self-sufficient institutions providing commercial microfinance and developing inclusive financial systems. Zeller and Johannsen (2006) describe that the old paradigm of sector-directed, supply-led and subsidized credit has based on faulty assumptions about the willingness and ability of poor farmers and micro-entrepreneurs to pay for financial services. This assumption has led to faulty policy designs and implementations. The new paradigm of developing inclusive financial systems departs not from the need. It takes into account the demand including willingness and ability to pay for savings, credit and insurance services by micro-entrepreneurs. One of the most important changes is the shift from microcredit to microfinance. Microcredit meant mostly providing loans whereas microfinance includes also providing insurances, collecting savings from the low-income households and marketing client's outputs. Armendáriz and Morduch (2010) also introduce the new stream thought that the savings could be even more important than loans for the poorest people. Nevertheless, savings and loans should not be substitutes but complementary activities to providing loans.

In addition to broader services and more professional operations, there is a huge amount of innovations and new trends in microfinance industry. Its future potential has been noticed around the world. Spreading of the new technologies enables availability of microfinance for millions of new people. Banking through mobile telephones is taking off for example in the Philippines, South Africa and Kenya. Mobile banking can reduce costs and increase the quality of services, even in poor communities. It also brings banking services available for new customer groups that are living too far from the traditional bank branches. Honohan (2009) founds that higher mobile phone penetration and better institutions of governance are correlated across countries with the access of finance, even after controlling for per capita income. In addition, social networks will be even more important in marketing and distributing the microloan services in the future based on the Wydick et al. (2011) research. Wydick et al. (2011) find endogenous peer affect to appear in some extent among geographical neighbors, but appear most strongly within church networks among their sample of households in Guatemala. They conclude that MFIs should consider using existing social networks such as churches in their attempts to broaden and/or deepen the outreach of their

microfinance services. In recent years, there have also been new ways of microfinance through internet. One example is KIVA which is a non-profit organization with a mission to connect people through lending to alleviate poverty. Leveraging the internet and a worldwide network of microfinance institutions, allows individual people to make small loans for the poor people in the developing world that need financing.

2.2. Microfinance as a solution to information asymmetry problems

One of the reasons for the existence for microfinance is that it is able to tackle the issues that other forms of borrowing were not able to do. Microfinance offers innovative ways to handle information asymmetry and capital requirement problems that neither traditional banking nor informal lending could provide by themselves. Asymmetric information refers to a situation in which one party in a transaction has more or superior information compared to another. Asymmetric information causes issues in a form of agency problems. Agency problems arise while the interests of two groups are not aligned. It often refers to a relationship between a principal (often shareholder) and an agent of the principal (often management of the company). In the context of microfinance, agency theory refers also to a situation where lender is unable to observe the borrower's characters or effort, or to observe her profits. In this context, the principal (the lender) is trying to do business with the agent (the borrower) (Armendáriz and Morduch, 2010). The problem arises from the two main factors being that the poor people do not have sufficient collateral to offer as security for banks and the banks have incomplete information about poor borrowers. In addition, it is difficult to enforce contracts in countries with weak judicial systems. The main problems arising from the asymmetric information are namely adverse selection and moral hazard.

2.2.1. Adverse Selection

Adverse selection problems arise before contractual agreement takes place because banks are not able to discriminate against risky borrowers (Armendáriz and Morduch, 2010). The loan officers won't have all the necessary information or it is too costly to acquire. Adverse selection is likely to occur because it is hard for lenders to determine which customers are likely to be risky and which safe. Lenders would naturally charge riskier customers higher rates compared to safe ones. In this way, lenders could compensate for the added probability of default. Due to the fact that the lender cannot identify the risky and safe customers, the lender raises average interest rates for all the customers, which may drive the safe customers out of the credit market. At some point, the interest rates increase to a level that safer

borrowers do not want to take loans at that rate. The consequence is that the bank is left with the very risky pool of borrowers. This is a market "imperfection" since worthy borrowers do not participate in the credit market when efficiency would suggest they should (Armendáriz and Morduch, 2010 p.42).

2.2.2. Moral hazard

Armendáriz and Morduch (2010 p. 48) define that moral hazard in lending refers to a situation where the bank's risk is tied to unobservable choices made by borrowers. Lender's cannot observe borrowers' choices (about how hard to work or which projects to choose) nor the realization of project returns. Ex-ante moral hazard refers to a problem that lender cannot ensure that borrower are putting in full effort to make their investment projects successful. It relates to the idea that unobservable actions or efforts are taken by borrowers after the loan has been disbursed but before the project returns are realized. Ex-post moral hazard happens if after the projects have been completed and profits realized, the lender may not be able to verify the magnitude of the returns. The borrower could take the money and run without repaying. It is tempting for the borrower to claim to have had bad luck (and to ask for a reprieve in paying the loan) when in fact the investment was highly profitable. This is also called as enforcement problem, which refers the difficulties that emerge after the loan is made and the borrower has invested.

2.2.3. Information asymmetry resolved through the group lending methodology

Agency problems are basically a mismatch of resources and abilities. On one side, banks have funds to lend but they lack information and cost-effective ways to make the agreements. On the other side, local people have all the information necessary but they lack the capital to make the loans. MFIs may try to hire local employ but there is a risk whether they work reliable way in the bank's best interest. Microfinance aims to answer to this question and provide indirect linkages between the money lenders and the borrowers or potential borrowers. Group lending practices are generally less costly, as Hermes et al. (2011) present, supporting the view that this lending technique helps reducing information costs related to lending to the poor more than other lending techniques do.

Joint-liability group lending methods is one of the innovations in microfinance industry that is utilized to solve information asymmetry problems. In solidarity group lenders case institutions employ contracts based on joint liability with "solidarity group". Group loans have been the

most famous way of providing microfinance services. Loans are not given for individual people but for a group from three to ten persons. Basically, group members are allowed to self-select other group members and are given an incentive to monitor their peers and put pressure on defaulting group members. Banks cannot know the risk profiles of their customers since there is not enough information available. In the case of individual loans, banks are not able to price the risk into the interest rate, because they do not know the risk profiles. In the group lending, the groups want to include only the members that are trustworthy and most likely to pay their loans back. Moreover, the members of the groups have similar risk-profiles. Self-selection therefore solves adverse selection problem.

On the other hand, monitoring and social sanctions provide solutions to moral hazard problems. In the developing countries, the community is very important and therefore people are ready to work for the common good and avoid moral hazard. Group members are usually willing to support if one member is in trouble because otherwise they are not able to get loan by themselves. Group responsibility clause of contracts can mitigate the moral hazard, adverse selection and enforcement problems crippled previous attempts at lending to the poor by outside financial institutions (Armendáriz and Morduch, 2010).

Even though the group lending is a cornerstone in the microfinance industry, there are also downsides and inefficiencies. This includes for example too harsh punishments due to the default of one people. Group lending may be unsuitable for wealthier borrowers, which has led renowned institutions such as Grameen Bank in Bangladesh and BancoSol in Bolivia to offer individual lending contracts for their better-off clients (Ylinen, 2010). Also Armendáriz and Morduch (2005) explore that in relatively industrialized areas, group lending may be a poor fit for potential customers. Armendáriz and Morduch (2010) argue that actually group lending methodology won't give any new information to the bank but gives the members of the group incentives to use their information to the bank's advantage. Armendáriz and Morduch (2010) question the efficiency of the group lending methodology in a following way: Might groups collude against the micro lender by collectively deciding not to repay? If the group of borrowers is not willing to impose social sanctions upon themselves, can the group nonetheless provide advantages? They also find some questions relating to peer monitoring. What would be the results if the population of borrowers is dispersed and local information is therefore weak and costly to obtain? Armendáriz and Morduch (2010) explore for example the situation that if the loans are given in a region where work mobility is very high and the

case that what would happen if the group members are not able to observe each other's efforts. This may discourage people to try their best and increase the free-riding problems.

2.2.4. Solutions beyond group lending methodology

Armendáriz and Morduch (2010) describe that the recent trend has been that MFIs tend to shift from group loans to individual loans. Therefore all the problems are not resolved through the means mentioned above. Individual-based lenders use bilateral lending contracts between a lender and a single borrower. Liability for repaying the loan rests with the individual borrower only. Group lending methodology makes microfinance different from conventional banking because of many new elements used. Nevertheless, those elements are not intrinsically linked and therefore can be used separately from the group lending method. Armendáriz and Morduch (2010 p. 137-162) define the ways to separate components including (1) creating dynamic incentives, (2) frequent repayment installments or (3) complementary incentive mechanism. At the moment, many of the MFIs do not necessarily involve group loans but use other innovative elements more flexibly.

The first important way to capitalize the benefits of the innovative ways of handling information asymmetry problems is to be able to create dynamic incentives. Dynamic incentives include non-refinancing threat, progressive lending, competition and incentives. The threat to stop lending is strong if the customers have close and repeated relationship with the borrower and if they make sure that borrowers do not have contracts with other potential lenders (Aleen, 1990). Progressive lending is the bases of these innovative ways to provide microfinance. It was also bases in the original Grameen Bank methodology. Armendáriz and Morduch (2010) define that the progressive lending refers to the practice of promising larger and larger loans for groups and individuals in good standing. Progressive lending allows the lenders to test borrowers before increasing the loan sizes. Competition and existence of several players has a positive impact if the market is controlled through information sharing through credit bureaus. The problem with competition is that the borrowers may start to take loans from the several players. Armendáriz and Morduch (2010 p. 146) claim that the cooperative behavior between the microlenders, could help to mitigate the problem.

The second way to capitalize the benefits from the elements used originally in the joint-liability lending, is to set frequent repayment schedules. These repayment times can be monthly, weekly or even daily in the beginning. Often the repayment time lengthens if the customer is able to provide earlier payments in time. The frequent repayment installments are

the other very efficient way to improve microfinance sector performance also for individual lenders. Nevertheless, this kind of incentives may be problematic as Pellegrina (2011) explains. The reason is that tight repayment schedules may preclude borrowers from undertaking long-term investments. This often happens in the agriculture industry where the production cycle is long.

The third important category that Armendáriz and Morduch (2010 p. 137-162) introduce, is the complementary incentive mechanism. Some of these additional means are already in use and working while others are still in the level of theory. Complementary incentive mechanism includes flexible approaches to collateral, financial collateral, making repayments public, targeting women, information gathering by the bank or cross reporting. In the other industries, both adverse selection and moral hazard could be solved by offering collateral, but in the low income countries, borrowers won't have anything to offer as collateral. Flexible approach to collateral means that the bank accepts different kind of collaterals for example tangible assets such as livestock, land and housing. The idea is that the resale value of the collateral is not the main interest but the value for household to give up the collateral. Financial collaterals on the other hand mean that borrowers need to build up financial assets (e.g. savings account) and use that as collateral. Public repayments are an effective tool since the borrowers have a threat of social stigma. Targeting to women can be used as well in the individual lending than in joint liability lending and women seem to be more reliable repaying their loans compared to men. Information gathering by bank staff can be efficient tool if the bank is able to incorporate neighbors in the credit decisions. Cross-reporting on the other hand refers to a methodology where statements made by one borrower about another are used as bases for the loan processing. Through these means which are originally used in the joint-liability lending, microfinance institutions are able to provide financing also for individual people.

2.3. Effectiveness as a development tool

Microfinance aims to reduce poverty by employing profit-making banking practices in low-income countries and communities. Access to basic financial services such as savings, payments, and credit can make a substantial positive difference in poor people's lives. For firms, especially SMEs, lack of access to finance is often the main obstacle to growth (CGAP 2010). Microfinance industry has grown remarkably in recent years but there are still debates whether it really contributes substantially to reduction of the poverty. Advocates argue that it is one of the most efficient tools to reduce poverty whereas opponents argue that microfinance

won't improve the living of the poorest of the poor. I will now go through some positive and negative views whether access to finance through microfinance helps to reduce poverty.

I start with the advocates' view that also many politics and specialist follow and which have led to big subsidies and general acceptance to microfinance industry as an effective development tool. Hermes and Lensink (2011) state that first of all, access to finance raises investments in income generating activities and possible diversifies the sources of income which may contribute to a long-lasting increase in income. Mosley and Hulme (1998) define that the tendency for the willingness to take risks and to invest in new technology usually increases with income. For the core poor, borrowing for consumption enables them to reduce gradually their income-vulnerability. By the aid of that, they are able to get themselves into position where they can contemplate riskier investments in working capital, hire personnel and eventually invest also in fixed capital. Access to finance may contribute to better education, health and housing of the borrower. It also contributes towards gender equality and therefore to an improvement of the social and economic situation of the women.

Hermes and Lensink (2011) also explain that the spillover effects have a high impact on poverty alleviation. Maes and Reed (2012) define that on average five family members are affected by the loan. The indirect effect on the villages and communities are manifold compared to that. The spillover effects may be even higher in the case where loans are given for better-off poor. Therefore it can be reasoned that giving loans for the better-off poor could actually lead to greater overall poverty reduction.

There are also some additional positive effects of microfinance. Becchetti and Castriota (2011) find that microfinance can be a very effective recovery tool after disasters. Their main findings, based on the evidence from Tsunami 2004, are that the post-tsunami loan to income ratio has a significant effect on the borrowers' recovery measured in terms of change in income or in worked hours and the effect of the loan to income ratio is significantly stronger for damaged versus non-damaged borrowers. This kind of new ways to handle natural disasters are very beneficial and it can be seen that recapitalizing MFIs under stress after disasters may provide an effective liquidity injection that can restart and stimulate economic activity.

From the critics point of view there is a doubt if microfinance actually reduces the poverty and this is mainly due to fact that the poorest of the poor won´t necessarily have access to finance as Hermes and Lensink (2011) describe. Reasons behind are for example that poorest

of the poor often decide not to participate in microfinance programs since they lack confidence or they value the loans to be too risky. The core poor are often not accepted in group lending programs by other group members because they are seen as a bad credit risk. The staff members of microfinance institutions may prefer excluding the core poor since lending to them is seen as extremely risks. For these reasons, the way microfinance programs are organized may lead to the exclusion of the core poor (Hermes and Lensink, 2011). In addition, microfinance may not be used for purposes that borrowers mention when applying the loan. The different usage of the money and the high interest rates may lead to damaging situation for poorest of the poor. There is for example evidence that men may use the money borrowed and leave women with the debt burden (Hermes and Lensink 2011). Self-evidently this does not improve women´s situation in the developing world.

One important critic for microloans is that it may not be suitable in some sectors and therefore recommendations cannot be generalized. Pellegrina (2011) compares microfinance, bank lending and informal channels in the agricultural sector to study the impact of microfinance on investments. She finds that in the agriculture sector households borrowing from informal sources or banks invest more compared to ones that borrow from microfinance institutions. She finds that in some sectors microfinance loans mainly help to increase working capital expenditure, whereas bank loans play an important role in accumulating fixed assets which is important for long-term productive activities. Pellegrina (2011) therefore shows that microfinance may be less effective in increasing long-term investments compared to the bank loans in the agriculture sector. In the worst case, microfinance could even push borrowers more towards investments in projects with short-term revenues.

3. Profitability and poverty outreach in the microfinance industry

3.1. Profitability

3.1.1. An increasing importance of profitability

As Armendáriz and Morduch (2010) state that for some people commercialization represents the corruption of an idea conceived as a poverty reduction strategy. To others, it is the hope and the future of microfinance. Hermes and Lensink (2011) describe two approaches about microfinance and its functionality. Financial systems approach emphasizes the importance of financially sustainable microfinance programs and the importance of being able to cover the

cost of lending money out by the income generated from the outstanding loan portfolio. On the other hand, poverty lending approach highlights the importance of providing mainly subsidized interest rates to help to reduce poverty. Today the general opinion is in favor of financial systems approach. The main argument is that if MFIs are not financially sustainable, large scale outreach of the poor cannot be achieved in the long-run.

It has become more acceptable to aim to private capital and more commercialized ways of operations. Krauss and Walter (2009) introduce some of the MFIs that have taken advantage of capital markets as an attractive financing alternative. The first was Banco Compartamos in Mexico, which undertook a $68 million local-currency microfinance bond issue in 2002 and subsequently listed on the Mexican Stock Exchange in a highly successful IPO in April 2007. Also Morgan Stanley had microfinance issue worth USD 108 million that was oversubscribed 2007. Standard & Poor's announced plans in 2007 to begin rating MFIs, which would make microfinance-backed securities eligible for investment by pension funds (Krauss and Walter, 2009).

Even though there are some exceptions, there are still some hurdles before profit-maximizing companies could fully benefit from MFI market (Byström, 2008). Byström (2008) states that first, mainstream investors and commercial banks are used to dealing with regulated entities organized as profit maximizing firms that can go bankrupt and work in a clearly defined legal environment. Second, macropolicy and government regulation have to be adapted to accommodate commercial microlending. Third, if the international capital markets are to be tapped on a larger scale, the MFIs/investors have to be able to hedge the foreign exchange risk they are exposed to when they borrow/lend in a foreign currency. Fourth, multilateral development banks, donors, and similar entities have to support institutions and technical know-how in order to make microlending more efficient and transparent. It is important to be able to overcome these hurdles because there is a huge latent demand for financing as shown in the Figure 3. Morgan Stanley (2007) estimated that the estimated potential market demand for microfinance is about $250-300 billion and there is a potential to increase commercial capital tremendously.

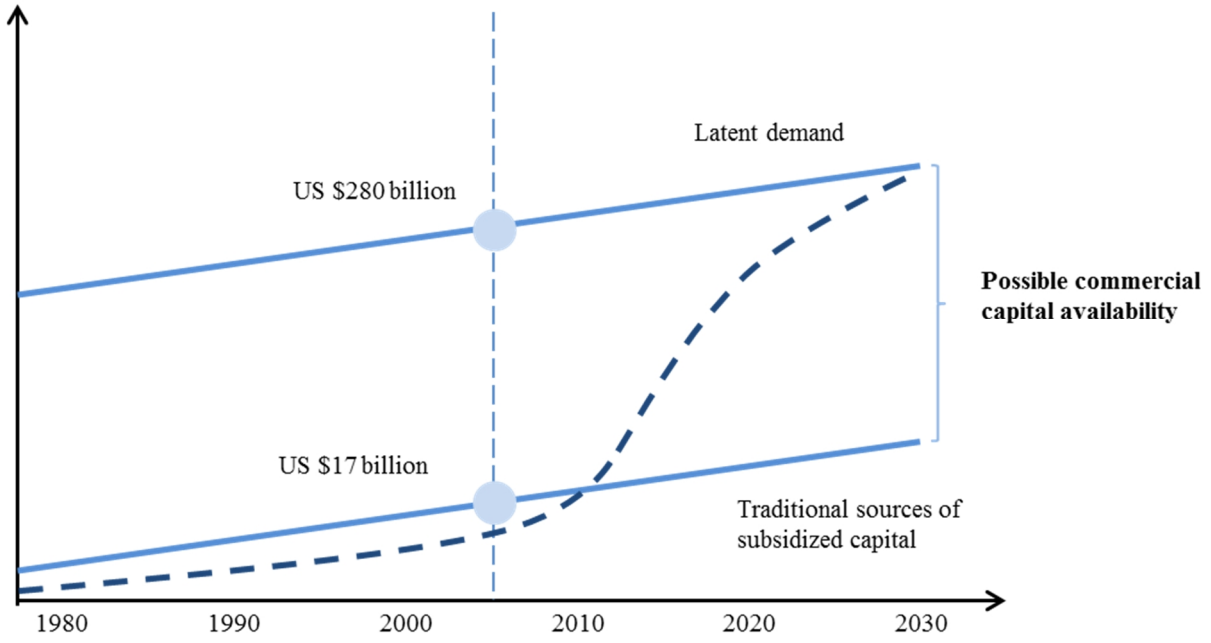

Figure 4
Current and potential funding for MFIs
Morgan Stanley (2007) explains that commercial sources of capital are critical to allow industry to reach its potential (illustrative). The estimated potential market demand for microfinance is about $250-300 billion.
Source: Morgan Stanley (2007)

Krauss and Walter (2009) studied that the role of nonprofit lenders and investors in microfinance institutions has declined as broader sources of funding have been accessed. These new sources include client deposits of bank-related micro-lenders, refinancing via interbank deposits and commercial loans, and fund raising in capital markets. Because there is a huge unmet demand, for profit-investors are needed to come into the microfinance market. In addition to large market size and demand, Byström (2008) explains that profit-maximizing companies should expand to microfinance market due to higher risk-adjusted returns from microlending than from corresponding traditional lending. Krauss and Walter (2009) find that returns from microloans to be largely uncorrelated with returns from most other asset classes and MFIs seem to a significant degree detached from global capital markets. However, MFIs domestic risk exposure might be lower than for most alternative emerging market investments. Byström (2008) also adds that commercially viable microlending could be an interesting alternative for private investors who want to alleviate poverty.

3.1.2. Revenue increase through higher interest rates

Profitability improvement can be achieved by increasing revenues or by cutting costs. In a case of the microfinance industry, the clear way to improve revenues is to increase interest

rates. Adverse selection and moral hazard affect remarkable on the optimal level of interest rates. Armendáriz and Morduch (2010) discuss about the arguments and recommend that prudently raising interest rates can be a key to microfinance success and partly eliminate information asymmetry problems. Nevertheless, they remind that raising the interest rates above threshold level can undermine the quality of the institution's loan portfolio and reduce profitability.

Kar (2011) explains that interest rates charged by MFIs have implications based on the agency theory. Generally, owing to the agency problems of adverse selection and moral hazard, interest rates charged to the borrowers affect financial performance of MFIs. Kar (2011) notes that interest rates affect loan delinquency rate and they also have impact on overall financial sustainability level. Demand forces may also affect this relationship between interest rates and sustainability because excessive high interest rates may reduce credit demand and thus profits (Cull et al., 2007). Kar (2011) finds out that the turning point for the interest rate is 30 % in his sample. Before turning point, interest rates can be increased safely and this will not harm the existing sustainability situation. He portrays the relationship between loan delinquency and yield and plot yield against predicted values of PaR30 and PaR90. U-shaped relationship confirm that PaR30 declines first as interest rates increase and then increases as interest rates go further beyond the turning point. U-shaped association can be explained by either selection effects or repayment effects. Kar's (2011) findings match with the standard adverse selection effects of high interest rates described in the literature.

It is a controversial issue whether high interest rates imply monopoly and inefficiency. High interest rates may be the sign that rich people are taking advantage of poor that won't have any other options than pay very high interest rates. Monopolists often make the market more inefficient, because they can decrease the amount of loans and charge the higher rates from the existing loans. High interest rates may not necessarily mean that there is monopolist position. Interest rates reflect how costly it is for moneylenders to acquire capital, to transact business, monitor clients and accommodate risk. If the default rates are high, the high interest rates may be necessary to make the lender to break even. By improving any of the mentioned areas, microfinance institutions could potentially be able to decrease the interest rates charged. Therefore high interest rates can be not due to monopoly profits or high default rates, but also due to high opportunity costs.

The profitability of institution can most likely be improved by raising the interest rates at least up to a certain threshold level. Nevertheless, it is important to notice that this may not support the ultimate poverty reduction goal of microfinance. Mersland and Strøm (2010) argue that if increasing revenue side, which means high interest rates for very poor people, the lending for the poor people is possible but the poverty reduction impact may not be sufficient.

3.1.3. Cost cutting with high poverty reduction potential

Many or the researchers argue (e.g. Mersland and Strøm, 2010) that improving cost efficiency of the institutions could be the best way to be able to reduce poverty through microfinance. If institutions are able to improve their efficiency and decrease the costs, the better services could be offered for the poor people. Compared to charging high interest rates, cutting the costs would have fewer negative side-effects on the poor people.

Mersland and Strøm (2010) study the evolution of average loan sizes offered by MFIs. Based on their investigation, they argue that MFIs should increase efficiency to be able to offer smaller loan sizes. They claim that cost aspect is crucial in the assessment of mission drift and being able to achieve both profitability and also sustainable outreach to the poor people. Cull et al. (2008) also recommend that it was a triumph to overcome the well-known problems of asymmetric information, but further innovation is needed to overcome the challenges of high costs. They found out, that the high rates of loan repayment are maintained, but the profit-maximizing investors have limited interest to those institutions that reach most of the poorest people. Those institutions charge the highest interest rates from their customers but also have the highest transaction costs due to small transactions sizes. There is therefore a great poverty reduction potential if institutions are able to invent more efficient ways to operate and streamline their cost structures. They would be able to either provide the same services to the poorest people with the lower interest rates or provide services to even larger amount of poor people without charging extremely high rates of interest.

3.1.4. Subsidies to ensure efficient operations

There are also arguments that microfinance institutions need subsidies to be able to improve their operations and develop those to more efficient direction. On the other hand, the advantage of microfinance industry has often thought to be that it has a possibility of achieving massive scale through highly efficient operations without on-going subsidies. The scale and the effect of subsidies is debatable topic.

Hermes and Lensink (2011) state that the full promise of microfinance, to reduce poverty without ongoing subsidies, is not met yet. They explain that there are quite many microfinance institutions that have been able to achieve high loan repayment rates but relatively few earn profits. Hermes and Lensink (2011) roughly estimate that only 1–2% of all MFIs in the world (approximately 150 organizations) are financially sustainable. In most cases, these are large, mature, regulated, and relatively well-known MFIs. There are about 8% of all MFIs that are close to being profitable. Both these types of MFIs are commercial organizations focusing on profitability. A third group, roughly 20% of all MFIs consist mostly of NGOs that may become sustainable in the future but are not yet sustainable. This means that 70 % of all the MFIs, mostly smaller start-up organizations, are far from being financially sustainable and are dependent on subsidies (Hermes and Lensink, 2011).

Nevertheless, there are very different views of the current status of subsidies. For example Cull et al. (2009) explains that the poorest people could be served without on-going subsidies. They state that it is more the norm than exception to earn profit in microfinance industry and therefore the full promise of microfinance seems to be achievable. They found out that the median nongovernmental organization do earn profits, thanks to the relatively high interest rates. Following to that they state that the profits are actually rather remarkable given the longstanding presumption that meaningful service to the poor can be done only with subsidy, a presumption consistent with mainstreaming economic theory. Cull et al. (2009) claims that 57 % of all MFIs and 54 % of all nonprofit MFIs in their sample were profitable. In addition, they found out that 87 % of all the borrowers were served by the profitable firms. The differences may come from the fact that institution can be profitable even though they would receive a large amount of subsidies. Therefore it seems that there is a potential for microfinance institutions to become profitable but there is still a lot of work to do before institutions can claim to be financially sustainable and profitable.

One of the fears of relying on subsidies is that it can undercut both scale and efficiency. Hartarskam (2005) shows the negative relationship between donors and operational self-sufficiency. This may indicate that donor representatives' ability to raise funds may have brought in easy money and, thus, lower incentives for sustainability. Morduch (2005) highlights the importance of recognizing that the same forces driving efficient outcomes in free markets, such as hard budget constraints, clear bottom lines, and competitive pressure, should also be deployed in contexts with subsidies. If deployed well, there are circumstances in which subsidies can increase the scale of microfinance outreach, access to commercial

finance, and depth of outreach to the poor (Morduch, 2005). Hudin and Traca (2011) find that subsidies have had a positive impact on efficiency, in the sense that MFIs that receive subsidies are more efficient than those that do not. Nevertheless when the subsidies increase beyond a certain threshold level, the marginal effect on efficiency turns to negative. Hudin and Trace (2011) research explores that 26% of MFIs receive levels of subsidization higher than that threshold, which implies that a marginal cut on subsidy intensity would increase their efficiency. Results can be interpreted in a way that small subsidies allow MFIs to increase the productivity of their staff, but beyond a certain threshold, they lower productivity in line with the moral hazard arguments.

Nevertheless, there seems to be a shift from subsidizing MFIs institutions to a focus on financial sustainability and efficiency of these institutions. This goal stresses the importance of being able to cover the cost of lending money out of the income generated from the outstanding loan portfolio and to reduce these costs as much as possible (Hermes and Lensink, 2011). In general, subsidies have both advantages and disadvantages. The most important thing is to be able to implement possible subsidies in a sustainable way.

3.1.5. Measures of profitability

Profitability of institution can be measured with several proxies. Most commonly used are probably operational self-sufficiency (OSS), financial self-sufficiency (FSS), return on assets (ROA) and profit margin. OSS is financial revenues divided by the sum off financial expenses, impairment loss and operating expense. The measure indicates whether lenders cover their operating costs and therefore the ratio is a rough measure of efficiency (Armendáriz and Morduch, 2010). Financial self-sufficiency on the other hand is adjusted operating revenue divided by the sum of adjusted financial expenses, loan loss provision expenses and operating expense. ROA is the ratio of net operating income after taxes over average total assets, to measure profitability. It measures how well MFI use its total assets to generate returns. Profit margin is the net operating income divided by the financial revenue.

3.2. Outreach

3.2.1. Reaching the poorest of the poor to alleviate poverty

Outreach in microfinance discussion describes how well the poorest people are reached and how well MFIs are able to meet their poverty alleviation mission. The measures of outreach

are rough estimations of the actual outreach. Schreiner (2002) introduces different dimensions of outreach which include worth, cost, depth, breadth, length, and scope. This framework encompasses both the poverty lending approach and the self-sustainability approach (similar to financial systems approach). The poverty lending approach assumes that it is best to help a few very poor people a lot for a short time with only loans. The self-sustainability approach assumes that it is best to help many less-poor people a little for a long time with a range of financial services (Schreiner 2002). Schreiner concludes that most of the dimensions are difficult to measure and it is especially true in large datasets as one used in my research.

Quayes (2012) defines that social outreach generally refers to either breadth of outreach or depth of outreach. It may occasionally include outreach to women borrowers. Breath of outreach is measured by the number of people a MFI has extended credit to, or the number of borrowers over a specific time period. Depth of outreach is defined as access of credit disbursement to poor people; wherein the poorer the borrowers are the greater is the depth of outreach. I use the depth of outreach as my primary dimension. It is the dimension that measures best the social focus of the institutions and is used in many other studies (e.g. Hermes et al., 2011; Cull et al, 2007).

It is still important to remember that poverty outreach does not mean that institutions could achieve each individual borrower. The question is more about the level of outreach and that a large scale of very poor people is reached, not all the poor people. Byström (2008) explains that it is obvious that the most credit risky borrowers will never be able to get cheap commercial funding. They will continue having to turn to money lenders or their social networks. This means that profit seeking institutions won't borrow to those individuals and they need help in a development aid based systems. Byström (2008) reminds that one should never forget that microfinance is no panacea for complete poverty reduction. There will always be people whose basic needs have to be supported by specific development programs: either because they simply are too poor or because they for some other reason are unable to find an economic opportunity no matter how cheap the funding is. And, finally, there will always be people that are never reached by any safety net, no matter how fine meshed the net is. Byström's (2008) finding is extremely important to keep in mind when studying the outreach of the institutions. Without that, the extreme examples may bias the whole research.

3.2.2. Measures of outreach

There are several proxies to measure outreach such as an average loan size and percentage of women borrowers. Other commonly used measures for outreach are the use of group lending methods and proportion of rural populations (Mersland and Strøm, 2010). In my study, I have ended up using average loan balance and proportion of female borrowers and I explain those two more carefully in this chapter.

Average loan balance is divided by GDP per capita to provide comparable results for all the countries. In general, it is seen that smaller loan balances reflect to more focus on poor, bigger proportion of poor people in the customer base and therefore better outreach. Increasing average loan balance is expected to have positive effect on profitability if the tradeoff exists. There are some indications that the average loan size is not the best possible measurement to study the outreach of the poor even though it is a largely used proxy in the industry. For example Mosley and Hulme (1998) explain that many studies avoid calculations of poverty impact and often treat the fact that small loans are being made as the proof that the poor are being reached and the fact that loans are being repaid as proof that incomes have increased. Galema and Lensink (2009) explore the problem relating to outliers, because an MFI can appear to have less outreach, when it has just a few very large borrowers that distort average loan size upward. They also argue that cross-subsidization of smaller loans with larger loans can increase total outreach. Armendáriz and Szafarz (2011) argue that in richer regions like Latin America, there is actually more scope for cross-subsidization. This implies that the higher average loan size is not necessarily a sign of mission drift. In addition, comparing average loan size across countries is problematic since different countries are in different stages of development. This leads to a situation where a large loan in one country can be a small loan in another. Regardless of these shortcomings, the average loan size/loan balance is the most commonly used and accurate proxy for the outreach (e.g. Schreiner, 2002; Cull t al. 2007; Mersland and Strøm, 2010).

Because average loan balance is not the perfect measurement, I also use the proportion of the women as an indicator of outreach. Women have become a focus of microfinance worldwide. Maes and Reed (2012) show that from 1999 to 2010, the number of poorest women reached has increased from 10.3 million to 113.1 million. Armendáriz and Morduch (2010) explain that women may be better from the microfinance institution's standpoint and they may enhance efficiency in a broader economic sense. Both ex ante and ex post moral hazard can be

more easily reduced while borrowing for women. Women do not have that many opportunities to obtain credit and therefore they are willing to commit different kind of strings attached e.g. weekly repayment and small loan amounts. Women are also poorer and therefore their marginal utility function is deeper compared to men. Women are also less mobile which makes them more safe targets to borrow. Women have been shown to repay their loans more often and to direct a higher share of enterprise proceeds to their families (Karlan and Goldberg, 2007). Pitt and Khandker (1998) find out that consumption increases by 18 percentages when lending to women but only 11 percentages when lending to men. They also explain that women are more reliable and have higher payback ratios, credit for women increases the household consumption level significantly more than credit for men and women use more substantial part of their income for health and education of their children. In addition, the annual household consumption increases significantly more if credit is provided for women (Pitt and Khandker, 1998). Pitt and Khandler (2006) found that women empowerment increases remarkably through microfinance. Credit programs for women enable them to take greater role in household decision making, greater access to financial and economic resources, greater social networks, greater bargaining power against their husbands, and to have greater freedom of mobility.

Percentage of female borrowers is an important proxy to measure outreach of the institutions. Nevertheless, it is not perfect and there are difficulties with all the proxies used for the outreach. Critics think for example that at times women need to hand the money back to men who use the money and women are burden with the responsibility of the repayment (Hermes and Lensink, 2011).

3.3. Trade-off between profitability and outreach

3.3.1. Is it possible to achieve both profitability and poverty outreach?

One of the most controversial issues in microfinance has been the extent of the trade-off between profitability and reaching the poorest clients. These two objectives are the cornerstone of the microfinance industry and it is a very controversial issue whether these objectives are in conflict. Many of the studies today have found trade-off between profitability and outreach to some extend (e.g. Mosley, 1996; Mosley and Holme, 1998; Galema and Lensink, 2009; Hermes et al. 2011). Still there are other studies that show that the trade-off is not significant or it exists only in certain situations (e.g. Gonzales and Rosenberg,

2006; Cull et al., 2007; Hishigsuren, 2007; Mersland and Oysten, 2010; Mersland and Strøm, 2010; Quayes, 2012). The trade-off refers to a situation that institution would not be able to achieve high profitability without losing its outreach to poor people. If the trade-off exists, it means that profitable institutions are not able to reach the poorest of the poor, who need the microfinance services most. If trade-off would not exist, it means that institutions with higher profitability are able to generate more revenues or reduce more costs compared to less profitable institutions. They are therefore able to compensate higher cost of reaching the poorest in some other way. If the trade-off would not exist, it would indicate a positive future for commercialized microfinance institutions. Those would have a huge profit generating and poverty reduction potential.

Trade-off between profitability and depth of outreach stems from the fact that transaction costs have a fixed cost component so that unit costs for smaller savings deposits or smaller loans are high compared to larger financial transaction (Zeller and Johannsen, 2006). Cull et al. (2009) states that when both large and small loans require similar outlays for screening, monitoring, and processing loans, the small loans will be far less profitable unless interest rates and fees can be raised substantially. This law of decreasing unit transaction costs with larger size transactions generates the trade-off between financial sustainability and improved outreach to the poor (Zeller and Johannsen, 2006). In addition, Cull et al. (2011) find that administrative costs per dollar lent are much higher for small loans than for large loans, the interest rates necessary to cover all costs (including costs of funds and loan losses) are much higher for MFI loans than for conventional bank loans. There are also opposite hypotheses and for example Quayes (2012) finds out that lower costs are associated with smaller sized loans. This may be due to the fact that the terms and conditions of small loans are standardized and routine, and as such have a lower cost per borrower. Quayes (2012) also notes that many group loans are smaller in size and require lower cost of monitoring on part of the MFI management. In contrast, relatively larger loans may entail higher administrative costs and result in a higher cost per borrower. The trade-off between profitability and outreach would imply that shifting focus towards increasing sustainability and profitability reduces the scope for the more traditional social aim of the MFIs to serve the poorest people.

To cover the higher costs of providing small loans, MFIs may set higher interest rates or reduce their costs. Cull et al. (2007) find the evidence that there is the possibility of earning profits while serving the poor but it often demands high interest rates. Due to these higher interest rates, also MFIs that offer relatively small loans are able to make a small profit (Cull

et al., 2009). Ylinen (2010) also explores that there are advocates that promote the idea that interest rates should be raised to cost-covering levels. On the other hand economic theory finds several reasons why the rates should not be raised too high. Cull et al. (2007) also find that raising fees to very high levels does not necessarily ensure greater profitability. Most of the researchers suggest that it is not the target to provide small loans with extremely high interest rates. That is not a good way to reach poverty reduction. Ylinen (2010) concludes that even though some poor people have proved to be able to pay high interest rates, it does not mean that they all can because the non-financial abilities of the poor vary greatly. Therefore, improving efficiency could help enlarge market penetration and improve profitability of the MFIs. Through efficiency, MFIs are also able to facilitate the social mission, when they can pass the cost savings into lower interest rates.

Mission drift means that institutions would suffer even larger tradeoff between profitability and poverty outreach while they grow and mature. Mission drift can be used as a synonym for the trade-off studies but it is easily mixed with cross-subsidization or progressive lending and therefore it is not easy to determine. Mission drift is widely used concept in microfinance discussions which tries to answer to question: Have microbanks moved away from serving their poorer clients in pursuit of commercial viability? Armendáriz and Szafarz (2011) define mission drift as a phenomenon whereby an MFI increases its average loan size by reaching out to wealthier clients neither for progressive lending not for cross-subsidization. One general mistake is that it would be necessarily bad to provide financial services to the wealthier clients even though it is usually necessary to be able to serve the poorest clients in a profitable way. Based on the Armendáriz and Szafarz (2011) cross-subsidization occurs by mixing richer and poorer customers. This helps microfinance institutions to meet their outreach-maximization objectives, particularly when the continued flow of funds from international donors/local governments and socially responsible investors is biased in favor of self-sustainable institutions. Armendáriz and Szafar (2009) bring up a very relevant point that maybe mission drift should not be measured only based on the customers that MFI is lending to. Should for example high interest rates for monopoly holding MFI be included to the definition of mission drift? Too high interest rates from the poorest of the poor are not clearly aligned with the poverty reduction mission.

It is also important to note that the question is not black and white and clearly the effect will exist in some situation with some conditions. Gonzales and Rosenberg (2006) state, the practical question is not whether there is some trade-off between MFI profitability and client

poverty, but whether such a trade-off has significant force in the circumstances in which most MFIs are actually operating. Gonzales and Rosenberg (2006) define that in the first place some potential borrowers who are extremely poor, have no reliable source of income from which a loan could be repaid, and lack the opportunity to start microbusiness. They also state that secondly, some very poor people live in remote and sparsely populated areas where administrative costs of lending are extremely high, and where interest rates would have to be correspondingly high to cover those costs. Clearly it cannot be profitable to lend to people who are unlikely to repay. Therefore there are exceptions and poverty outreach doesn't mean that each individual poor would be reached. Trade-off studies rather investigate whether poor people can be reached in a large scale while maintaining profitability of the operations.

3.3.2. Empirical evidence of the trade-offs

There are some cross-country studies relating to the tradeoff between profitability and outreach. Proponent of the existence of the tradeoff is for example Mosley (1996) who studies the change from NGO to commercialized bank. He explains that objectives to reduce poverty and achieve financial self-sufficiency are often conflicting. He claims that poverty reduction decreases with the loan sizes whereas financial performance improves with loan size as economies of scale are reaped. In addition, Hermes et al. (2011) find that MFIs that have a lower average loan balance or MFIs that have more women borrowers as clients are less efficient. One important reason is the higher cost for borrowing to the poorest. In addition, if MFIs focus on maximizing efficiency, mission drift might be stimulated, since MFIs serving the poorer parts of the population are less efficient. Also, Galema and Lensink (2009) explore that MFIs face a trade-off between returns and outreach, since it is more costly to borrow to very poor borrowers. They also face a trade-off between risk and outreach, since it is typically more risky to finance the types of MFIs that serve the poorest borrowers. Moreover, Armendáriz and Morduch (2010) state that recent studies have shown a correlation between commercialization and a decline in the percentage of female clients as a share of total clients.

On the other hand, there are several studies that show that institution could achieve both profitability and poverty outreach. For example Quayes (2012) concludes that there is complementary positive relationship between depth of outreach and financial self-sufficiency. He concludes that it does not matter whether the financial sustainability is self-imposed by MFI or required by the donor agencies. Also Gonzales and Rosenberg (2006), using data of 2600 MFIs, show that there is no conflict between financial sustainability and outreach. They

show that there is no indication that serving poorer customers tends to hurt financial performance seriously. In addition, for example Hishigsuren (2007) concludes that institution won't drift from their mission because the deliberate decision by the management but more because of the challenges posed by the scaling-up process. He researched only very limited number of institutions in India to see if the trade-off is existent in some specific situation. He finds out that the MFI has not drifted from its poverty alleviation mission significantly when the drift is measured in terms of depth, quality, and scope of outreach. There are some minimal shifts but those are not large enough to indicate abandonment of the poorer members.

There are also several studies that find trade-off existing for some of the institutions but not for all of them. These studies indicate that tradeoff may be a problem in a certain situations. For example Mersland and Oystein (2010) find that the average loan size has not increased in the industry as a whole, nor is there a tendency towards more individual loans or a higher proportion of lending to urban customers. Nevertheless, Mersland and Oystein (2010) found that inefficient MFIs need to shift their loan portfolios toward larger average loans and are then most susceptible to mission drift. They also find that when an MFI increases its cost efficiency, it is better able to advance loans to the poorer members of the community. In addition, Cull et al. (2007) find no evidence on trade-off between their measures of profitability and outreach. They find some institutions that have both achieved profitability and meaningful outreach to the poor, but disaggregation by lending-type reveals trade-offs between the two objectives. Individual-based lenders as a group have the highest average profit levels, but they perform least well on measures of outreach. Individual based lenders find it cost effective to increase the average loan size. The lenders need to consider whether it can make sense to shift focus to wealthier borrowers who can absorb larger loans, even at the sacrifice of outreach to the poorest segments in a community (Cull et al., 2007). They also find that larger and older microbanks focus increasingly on clients that can absorb larger loans. Morover, Zeller and Johannssen (2006) did the research about the poverty outreach depending on the type of institution in the Peru and Bangladesh, in two counties where there is a long developed microfinance sector. The analysis shows that microfinance institutions are able to reach the poor, but that also a large share of their clients belongs to the non-poor population.

Differences in trade-off may therefore depend on the institution types, but also on the environment that MFI is operating. Vanroose and D'Espallier (2013) conclude that based on their market-failure hypothesis, mission drift is less likely in the countries with well-developed financial systems. MFIs serve poorer people in countries with well-developed

financial systems. In the countries with well-developed financial systems, traditional financial institutions and microfinance institutions stand in more direct competition with each other. This competition pushes MFIs down the market and makes mission drift by MFIs more likely. In addition some other studies find only slight or no evidence of trade-off in a microfinance industry as a whole, but the trade-off is often evident when dividing the sample to smaller groups.

There has also been discussion on incentives for MFIs to prevent the trade-off between profitability and outreach. Aubert et al. (2009) show how a positive correlation between wealth and repayment gives rise to problems in designing internal incentives for agents in pro-poor MFIs. They explore the situation where the costs of acquisition of information on wealth and auditing are high and the share of very poor in the population of potential borrowers is large. In this case, MFI will prefer to give incentives to agents to select based on the ability of repayment forgetting poverty levels. To bring up right kind of incentives, pro-poor targeting can be done by selecting impoverished geographical areas or by using financial products that are only attractive to poor borrowers. The problem arouses because some large areas are left uncovered and the method has a cost on the poor. For these reasons, improving methods to gather information on wealth and carrying low-cost audits is a priority to prevent mission drift among pro-poor MFIs.

4. Institution types in microfinance industry

4.1. Institution type based on agency theory

Institutions are different in forms of ownership, agency problems and governance. As Fama and Jensen (1983) state, the analyses of performance cannot be done independently of the question of governance. In regards to asymmetric information in microfinance industry the impact of institution type is relevant due to the different ownership structures. Agency problems usually arise in separation of ownership and management. Different institution types have their own ways to go through the information asymmetry problems and adapt to different control systems. Therefore the institution type of the MFIs is one of the main interests in my thesis.

One of the most well-known investigations about the institution type of the firm is the Jensen and Meckling (1976) research where they research property rights, agency theory and the theory of ownership structure for the firm. In the corporate governance literature, this problem

is known as the agency problem. This literature refers to the manager as an agent, who unlike a principal, does not own the resources of the firm. The principal bears the residual risk and is the residual claimant of the firm's wealth (Jensen and Meckling, 1976). Costs associated with this problem are called agency costs and represent costs that residual claimants bear in order to benefit from the professional services of managers. The goal of many governance mechanisms is to minimize agency costs by aligning the objectives of the owner-principal with the objectives of the manager-agent. Agency costs stems from the separation of the ownership and control (Jensen and Meckling, 1976). The costs can be minimizes depending on the way of organizing the management and control of the organization. Jensen and Meckling (1976) state that the agency costs arise in any situation involving cooperative effort by two or more people even though there is not clear cut principal-agency relationship. The most relevant agency problem in a relation to institution type is the one between the owners and the management as stated in the general theory.

In addition the owner-management relationship, the lender-borrower relations is crucial in the microfinance industry. In that case the agency problem refers to a situation where lender (agent) wants to do business with the borrower (agent). In the microfinance industry, the agency theory can also be thought in a way that the top management is the principal and loan officers (or other field staff) are the agents. By defining the relationship in this way, Armendáriz and Morduch (2010 p. 352) are able to study the difficulties that the management have in working with the staff members to whom the daily decisions are delegated. Managers must decide how to adequately reward their unobserved effort in order to most effectively maximize the institution's objectives. Based on this framework, management capacity of the MFI is one of the most important factors defining the success of the microfinance institutions. Microfinance industry brings some new viewpoint to the agency theory because donors are one of the main stakeholder groups. The principal-agent relationship can equally be applied to the relationship between the MFI and the donor (Mersland and Strøm, 2008). Donors may have problems of entrusting their money to microfinance institutions that are owned by profit-motivated investors (Mersland and Strøm 2008).

Hannsman (1996) states that the agency costs stem from the market based contracts between the enterprise and its stakeholders like employees, customers, donors, debt holders and from the practice of ownership between management and the owners as well as between the owners themselves. The argument is that the ownership cost can be minimized depending how the ownership is organized. Hanssman's (1996) logical reasoning that the intrinsic differences

between shareholders owned and NGOs lie in who controls the organization and who receives the profit from it. Also Mersland (2009) assumes based on the Hannsmann (1996) logical framework that different costs will be incurred depending whether the ownership is assigned to investors and customers compared to non-governmental organizations.

4.2. Introduction to different institution types

Fernando (2004) explains that the microfinance industry is going through a significant global change and the importance of the shareholder firms is increasing remarkably. Microfinance was largely an operation of NGOs and state-sponsored programs until the late 1980. At that time regulated and shareholder owned institutions started to provide a range of financial services to poor and low-income households. This change is largely due to transformation of NGOs to shareholder-owned firms. In recent years, the industry has been encouraged towards more regulated institutions and the general viewpoint has been that shareholder firms are the best way to organize operations. For example Mersland (2009) states that shareholder firms (in the thesis banks and NBFIs) are the most appropriate way of ownership defined in the literature. The main arguments are that banks can be regulated by banking authorities, accept deposits provide larger range of better quality services, be independent from donors, attract private equity capital and benefit from superior corporate governance because they are privately owned. Fernando (2004) states that in regards to profitability and outreach, shareholder owned firms have performed much better in comparison to conventional financial institutions.

Institution types may be divided in different ways, but I use division to banks, non-bank financial institutions (NBFI), cooperatives & credit unions and non-governmental organizations (NGO). I present the findings of the earlier literature based on these groups even though the categorization has been different in some of the earlier studies. Rural banks are not included in my analyses (similarly to Cull et al., 2009), because they are often state-run banks, sample size is very small and varying subsidy and operational policies imply. They target clients who live and work in non-urban areas and who are generally involved in agricultural-related activities.

Banks can be either government owned or shareholder owned institutions. MixMarket defines that banks are licensed financial intermediaries regulated by a state banking supervisory agency. They may provide any of a number of financial services, including: deposit taking, lending, payment services, and money transfers. Microbanks represent a wide array of

institutions. Common is their primary operational focus on reaching financial sustainability. Zeller and Johannsen (2006) explain that they differ from commercial banks in two aspects. First, they acknowledge and wish to serve the demand for financial services for micro and small-scale customers and entrepreneurs. But they often avoid mentioning the word poor or poverty in their mission statements. Second, they use collateral substitutes and other innovations, just like other MFIs. Microbanks include the state-owned community-level banks or micro-banks "built from scratch" with technical assistance from consulting companies (Zeller and Johannsen, 2006). Their main difference with credit unions and village banks is that they are not owned by their members, but either by individuals or legal entities. Legal entities can be the state, NGOs, private companies, or individuals, or a mix of all. Zeller and Johannsen (2006) point out that while the social and poverty focus of member-based MFIs is clearly embedded in the ownership and therefore incentive structure, microbanks depend on the social commitment of its owners to make compromises between making more profit and staying at the lower end of the market. Because of their profit orientation, microbanks offer relatively high loan sizes. Therefore they may be unlikely to reach the poor in any significant number. However, these better-off clients may not have any access to traditional commercial banks and loans to small and medium enterprises can make an indirect contribution to poverty reduction, e.g., by creating jobs for the poor people. While depth of outreach may not be their comparative advantage, the advantages of microbanks lie in serving the neglected middle market (Zeller and Johannsen, 2006). In regards to ownership theories, banks are similar to private companies. They are characterized by the separation of management and control (Fama and Jensen, 1983). The managerial power seems to be smaller in banks compared for example to NGOs. As Fama and Jensen (1983) explain the lack of autonomy and independence in shareholder owned firms can reduce the effectiveness of the organization and to expropriation by managers.

Non-bank financial institutions (NBFIs) are shareholder owned firms. NBFIs provide similar services to those of banks, but are licensed under a separate category. The separate license may be due to lower capital requirements, to limitations on financial service offerings, or to supervision under a different state agency. In some countries this corresponds to a special category created for microfinance institutions (MixMarket). Armendáriz and Morduch (2010) state that nonbank financial institutions tend to have more efficient processes while retaining the flexibility of less commercial institutions. Based on the Hannsman (1996) ownership strategy, in NBFIs, shareholders control the organization, decide on how to

distribute profits, and are free to sell their privileges. In regards the agency costs, the interests of owners and management are not fully aligned in shareholder owned firms similarly to banks. Therefore it causes some risks for the managing the organization. The agency cost can be mitigated in similar way than in other for-profit institutions.

Cooperatives and credit unions are registered under a country's cooperative law or are included as a special category in the banking law, but may lack effective external supervision or authorizing legislation. They are non-profit, member-based financial intermediaries and may offer a range of financial services, including lending and deposit taking, for the benefit of its members. Armendáriz and Morduch (2010) define that credit unions and cooperatives tend to be embedded in their communities, and they can benefit from the ability to collect savings. These institutions often face governance issues because members who are net savers have different priorities compared to members that are net borrowers. The borrowers are often more homogeneous compared to other institution types. While not regulated by a state banking supervisory agency, it may come under the supervision of regional or national cooperative council (MixMarket). Zeller and Johannsen (2006) state that the major comparative advantages of credit unions lie in their ability to service large numbers of depositors in urban as well as higher-potential rural centers and use these savings to provide a diversified range of loans to individual members. Based on the Hanssman (1996) theory, in the case of cooperatives, the control is in the hands of members through the voting rights. The members are also the only ones who are financially supposed to benefit from the company. In regards the agency theory, it could be thought that in cooperatives the interests of the principal and the agent are well-aligned since the owners are the ones that also manage and use the institution's benefits. While most members of credit unions are for non-poor people, this type of institution also reaches many poor people because of the breadth of outreach (Zeller and Johannsen, 2006). Since the members, owners, management and borrowers are mostly the same people, the information asymmetry problems can be reduced through this institution type. Labie and Périlleux (2008) study credit unions and find out that this form of institutions are clearly growing and the growth is based on the development of networks.

Non-governmental organizations (NGOs) are organizations registered as a nonprofit for tax purposes or some other legal charter. The financial services of NGOs are usually more restricted and do not usually include deposit taking. These institutions are typically not regulated by a banking supervisory agency (MixMarket). As Armendáriz and Morduch (2010 p. 347-375) find out NGOs are flexible and innovative, but they can suffer from weak

governance because stakeholders are often passive and only weakly influence management. Based on the Hannsman theory (1996), there may be several main stakeholders, but no particular group or person can legally claim ownership of it or receive residual earnings from it. The practice of ownership involves costs such as agency costs from the separation of the ownership and the cost of collective decision making. The hypotheses based on Jensen's and Meckling's (1976) agency theory would be that the agency costs are higher for NGOs because they do not have a specific owner. Nevertheless, NGOs may be able to offset that loss in agency cost by reducing customer adverse selection and moral hazard due to closer customer relations and better tapping into local information networks (Hanssman, 1996). Cull et al. (2009) found out in their study that among the leading institutions, nongovernmental organizations are far from peripheral: they serve more borrowers overall and more borrowers on profit-making bases. This statement holds only before controlling the subsidies. After doing the adjustments to subsidization, it seems that without subsidies, these institutions would not be able to achieve profits. Moreover Hanssman (1996) argues that NGOs can operate successfully in more imperfect market compared to other types of microfinance institutions.

Microfinance sector has many specific characters and therefore all the effects cannot be taken directly from the other industries. Most equity holders in shareholder owned firms (NBFIs or banks) are NGOs which may indicate that the type of ownership probably matters less in microfinance than in other industries (Mersland and Strøm, 2008). Cull et al. (2009) states that trends in outreach will likely shift towards private sector banks as they grow and spread, but today nongovernmental organizations and other nonprofits maintain a large and distinct niche. For these reasons and changes, it is very important to do the through research whether the institutional type in reality has some effect on the financial and social performance of the microfinance institutions.

4.3. Performance and institution type

Most of the earlier studies have found some differences in profitability and outreach regarding institution type. Nevertheless, the effect of institution type to trade-off equation has not been studied comprehensively before.

There are several studies that show significant difference based on the institution type. Tchakoute-Tchuigoua (2010) study shows a significant difference in financial performance, efficiency, size, solvency and portfolio status according to the legal status of MFI. They

measure performance with different dimensions: profitability, commercial performance, social performance and organizational efficiency. The results depend on the dimension used. However, they found that private microfinance companies are more sustainable compared to NGOs. On the other hand, for example Cull et al. (2009) shows the more commercially oriented MFIs focus on better of clientele. MFIs seem in this way to act more and more as pure commercial banks. Moreover, Cull et al. (2011) did the research about the effects of regulation and supervision on MFI performance and outreach. They found out by controlling for the non-random assignment of supervision via treatment effects and instrumental variables regression, the evidence consistent with the hypotheses that profit-oriented microfinance institutions respond to supervision by maintaining profit rates. Nevertheless, those institutions curtail outreach to women and customers that are costly to reach. On the other hand, the institutions with a weaker commercial focus instead tend to reduce profitability but maintain outreach. Based on these findings, some national legal frameworks consider NGOs and most cooperatives as inferior to banking organizations (Mersland, 2009). One consequence has been a call for NGOs to transform into shareholder firms (Fernando, 2004; Mersland, 2009). Armendáriz and Morduch (2010 p.242) also state that the most important shift for a commercialized institution is the ability to distribute profits to shareholders. Nothing bars NGOs from earning profits and many NGOs even do that. However, profit earned by an NGO cannot be distributed to shareholders. Instead, profit is generally re-invested in the institution. With transformation into a fully regulated, commercial business, profit can be earned by investors, providing the opportunity to attract shareholders with only limited social goals giving commercial microfinance institutions access to vast pool of capital.

On the other hand, Mersland and Strøm (2008) found that difference between shareholder owned (banks and NBFI) MFIs and non-governmental MFIs is minimal in regards of performance. They recommend that instead of transforming NGOs to commercial institutions, governments could support adaption of legal framework allowing well-performing NGOs to mobilize savings. Mersland and Strøm (2008) found that NGOs are not more socially oriented than shareholder firms and shareholder firms are not more commercially oriented compared to NGOs. Shareholder firm's superiority in scale and scope do not seem to be related to ownership type, but to the legal constraints which impede most NGOs from mobilizing savings. They conclude that NGOs are driven by the same economic rationality as any other banks. Hartarska and Nadolnyak (2007) end up to a similar conclusion and found no difference in performance or outreach depending on the legal form (regulated/unregulated).

However they find that MFIs collecting savings, achieve better outreach which implicates many indirect benefits from regulation. Nevertheless, higher capitalization rates or bigger leverage won't increase outreach. Hartarska (2005) also studied corporate governance in East European MFIs and didn't find the effect of organizational structure on performance.

Findings from the literature relating the institution type are inconclusive. Many of the researchers do not state that any form of ownership would outperform others, but admit that the institution types are different. This is further supported by findings in general banking markets as well as the pro-poor banking history, indicating that mutual and non-profit ownership can compete successfully with investor ownership. For example Mersland (2009) research the cost of ownership and found out that cost-variables related to market contracting favor NGOs and COOPs, whereas most cost-variables related to the practice of ownership favor shareholder firms. Mersland and Strøm (2008) conclude that ownership theories do not bring the clear predictions regarding the efficiency of different ownership types in microfinance markets.

4.4. Should regulation be encouraged?

There are also several studies that indicate that stronger regulation would effect on performance of the institution. Banks and cooperatives are more regulated compared to other institutions (Lapenu and Zeller, 2001) and therefore regulation is closely related to institution type. From the public policy perspective, banking regulation is justified by market failure arising from asymmetric information, market power and negative externalities (Freixas and Rochet, 1997). Asymmetric information inherent in the transaction between the financial intermediary and depositor is the most fundamental reason for the banking regulations (Freixas and Rochet, 1997). Depositors are small, dispersed, uninformed and cannot therefore exercise their control rights and effectively monitor managers. Market power may be the relevant issue if MFI operates as a local monopoly. Contagious bank runs occur when the failure of one bank imposes a negative externality on other banks and jeopardizes the safety of the payment system (Hartarska and Nadolnyak, 2007). Some MFI could create negative externalities but the relevant question is to what extend a small MFI operating in a niche market represents a threat to the payment system of a country and is this threat large enough to justify the cost of regulation. Solvency regulation prevents the impact of negative externalities but it often relies on the quality of collateral to classify the risk. However, MFIs usually use group loans and promise of larger loan sizes instead of collaterals.

Some researchers claim that the current push for commercialization and regulation of MFIs is not justified by cross-country studies but is based on the positive experience of transformed incumbents. Hartaska and Nadolnyak (2007) present some reasons to object regulations such as regulatory capture, creating and extracting rents and to preventing entry by the new competitors. In addition, Hartarska and Nadolnyak (2007) recommend that MFI's transformation into regulated financial institution may not lead to improved financial results or outreach. There may be some indirect impacts because MFIs collecting more savings reach more borrowers and the only way that MFIs can access savings is through regulation. In addition, Mersland and Oystein (2009) found no effect of bank regulation in financial performance and outreach. Hartarska and Nadolnyak (2007) state that regulatory involvement may lead to a mission drift if demands to fulfill regulatory requirements (e.g. capital adequacy) divert attention away from serving the poor (e.g. by shifting the focus from serving poor clients to serving wealthier borrowers to improve capital adequacy ratios) and may hold back innovation in lending technology that has been the driving force behind MFIs ability to expand outreach and serve poor clients.

Regulatory costs are often high for microfinance institutions because of limited scale economies. Relative to their assets, smaller institutions face higher costs than larger institutions in complying with regulations (Armendáriz and Morduch, 2010 p. 259). Some of the requirements that regulated microfinance institutions face are the rules governing operations, minimum capital requirements, consumer protection, fraud prevention, establishing credit information services, secured transactions, interest rate limits, foreign ownership regulations and tax and accounting issues. In addition to that, institutions need to hire relatively costly personnel to handle the legal and reporting requirements of the regulated institution. Even though the risks and the costs related to intermediation and regulation are high, many social mission institutions want to be regulated to be able to take deposits. The development impact of the savings is large and therefore institutions want to offer this possibility for the poorest of the poor.

One important point relating to regulation is that it may be better to concentrate support and licensing on the small minority of MFIs whose managers show the potential to produce massive growth. As Gonzales and Rosenberg (2006) explain microfinance industry tends to be concentrated. The median share of the largest MFI in a country is one third of the entire market. The median share is 81 percent for the top five MFIs, and 95 percent for the top ten. A similar concentration is visible when looking at the worldwide market, where 9 percent of

the MFIs account for 75 percent of the borrowers. Gonzales and Rosenberg (2006) claim that the pattern would seem to have strategic implications for development agencies and policy makers. In moving toward saturation of the microfinance market, it is probably not necessary to let "a thousand flowers bloom". As seen the viewpoints towards regulation are varying and closely related to institution type.

5. Synthesis of the literature review

Microfinance industry has been growing tremendously in recent years and effects on over half a billion poor and low-income people directly or indirectly (Maes and Reed, 2012). Nevertheless, based on the CGAP's (2010) forecast, there are still 2.7 billion people around the world that do not use formal financial services. There is a huge future demand and potential for microfinance industry to develop. Microfinance industry could provide access to finance for millions of people if able to capitalize commercial sources of funding. Microfinance has been able to combine the best sides from traditional formal and informal lending channels. Formal channels are capable of providing enough financing whereas informal channels provide knowledge about the local communities. As Cull et al. (2008) state the basic innovations to overcome the well-known problems of asymmetric information have been the cornerstone for the success of microfinance sector. The future development should be directed towards more efficient ways of operating.

There may be a tradeoff between profitability and poverty outreach of the institution, but evidence is inconclusive. The reason behind the tradeoff would be the higher cost linked to reaching the poorest customers. It may be more expensive to go to rural areas and provide smaller loans to the poorest of the poor. Nevertheless, this issue can be solved by either increasing the interest rates to cover costs or by decreasing costs through more efficient operations. As seen from the literature, viewpoints relating to trade-off between profitability and outreach are different. There is clear need for a comprehensive cross-country study with new and multiple year data. At the moment, many policy decisions are made based on the assumptions and not well-researched facts.

Not all the MFIs need to have the similar targets, goals and methodologies. Based on the literature, it cannot be stated that one institution type would be simple better than other because all of the types have their strengths and weaknesses. Nevertheless, Lapenu and Zeller (2001) show that more than 95 percent of the volumes of the microfinance transactions go

through banks or cooperatives. They state that although 60 percent of MFIs are still unregulated, they only account for less than 2 percent of the volume of savings mobilized and loans disbursed. Based on these numbers, it would seem that banks and cooperatives are the most efficient ways to organize institution. The commercial institutions may be able to provide services for the much larger amount of people in developing world. Nevertheless, Ylinen (2010) concludes that there is room and demand for a variety of MFIs: those focusing on the poorest and perhaps therefore depending on donations; as well as those moving up-market and serving a better-off clientele with the support of commercial funds. Cull et al. (2009) suggest based on their evidence that the future of microfinance is unlikely to follow a single path. They were investigating the profit-driven Banco Compartamos and the "social business" model of Grameen Bank and came into conclusion that both models have their own strengths. Commercial investments are necessary to fund the continued expansion of microfinance, but institutions with strong social missions, many taking advantage of subsidies, remain best placed to reach and serve the poorest customers, and some are doing so at a massive scale. Cull et al. (2009) conclude that the market is a powerful force, but it cannot fill all the gaps. In addition, Mosley and Hulme (1998) consider that there may be a need for different models of lending to the poorest for example focusing on the provision of the savings facilities, simple insurance facilities (e.g. against drought) and small consumption loans with flexible repayment periods. Based on the newest findings in the literature, there is demand for different kind of MFIs.

6. Hypotheses for the empirical research

Based on the academic research, it seems that no straight-forward conclusions can be drawn from the earlier research relating neither to trade-off nor to institution type. Nevertheless, I have been able to conduct three main hypotheses relevant to my thesis. The lack of comprehensive studies and clear-cut results strengthens the importance of my study. I start my empirical research by first studying profitability of the microfinance institution followed by its relationship to outreach. I have framed my hypotheses to get answers to my research questions: *Q1: What are the main drivers behind the profitability function of the institution? Q2: Can institutions achieve both high profitability and the large outreach to the poor? Q3: How does the institution type effect on the profitability and poverty outreach of the institution?*

I start the empirical part of my paper by studying the profitability function of the institution. I structure the model similarly to Cull et al. (2007) to identify the main factors affecting the profitability of the institution. I divide profitability to revenue and cost sides. Interest rates are the main driver in the revenue side. I scrutinize the effect of interest rates that bases on the asymmetric information problems. Increasing interest rates is expected to improve profitability up to the certain level and after that level profitability starts to decline. I hypothesize that increasing interest rates decreases portfolio quality due to the adverse selection and moral hazard. I expect the results to be consistent with the falling demand for credit and thus diminishing scale economies at high interest rates. The theory behind is that because lenders face informal asymmetry and borrowers lack collateral, charging interest rates above a certain threshold aggravates problems of adverse selection and moral hazard. At high interest rates, only low-quality borrowers that do not expect to be able to repay would find it in their interest to borrow. Cull et al. (2007) explain that if the hypothesis is true, microfinance institutions charging relatively high interest rates should expect to face lower repayment rates and profitability. They also claim that the relationship in regards the profitability (but not portfolio quality) could also arise from demand forces: overly high prices may reduce demand for loans. Even though rising interest rates is important, for example Mersland and Strøm (2010) state that the cost side efficiency may be even more relevant to the overall profitability and poverty reduction potential of the institution. Based on these findings from the literature, I form my first hypotheses relating the profitability function of the institution.

H1: The main drivers for the profitability of the microfinance institutions are increasing interest rates and decreasing costse.

After understanding the roots for profitability of the institution, I proceed towards the second research question to form hypotheses on the outreach function. In regards the trade-off between profitability and outreach, my hypothesis is that higher levels of outreach are related to lower levels of profitability of the institution. It would indicate that MFIs experience trade-off between profitability and outreach to the poor. This is due to the fact that it is more difficult and expensive to reach the poorest clients, customers may not be able to repay their loans and processing many small loans could be more expensive compared to few large loans. I test the outreach through the average loan balance of the institution as well as with the percentage of female borrowers. I also expect that older and larger institutions would have higher average loan balance and the trade-off would be larger when institutions grow and

mature. Earlier academic results relating to trade-off have been inconclusive as explained in the literature review.

H2: MFIs experience trade-off between profitability and poverty outreach meaning that higher levels of profitability are related to lower levels of outreach.

The third research question, about institution type, is studied throughout two other hypotheses because institution type effects on both of them. Ownership theories do not provide clear prediction regarding preferred ownership type in the microfinance markets. The relationship between ownership and either performance or outreach have been studied with inconclusive results. I hypothesize that the institution type effects on the trade-off equation especially because institutions' cost structures differ significantly. Hermes et al. (2011) explains that the cost functions may differ between types of MFI due to differences in the levels of subsidies these institutions receive outside. Based on the Lapenu and Zeller (2001), banks and cooperatives seem to have highest transaction volumes in the microfinance industry. Shareholder firms (banks and NBFI) and cooperatives are expected to be most profit-oriented institutions. Accordingly, I assume that NGOs are in general more socially oriented. Based on the Schreiner's (2002) framework assumptions, more socially oriented MFIs trade off narrow breath, short length and limited scope with greater depth, while less socially oriented MFIs trade off shallow depth with wide breath, long length and ample scope. Regarding the outreach, my hypothesis is that NGOs would be more socially oriented and have greater depth of outreach. Based on the literature, I would expect banks, NBFIs and cooperatives to trade-off the depth of outreach to obtain higher profitability levels. I would expect banks, NBFIs and cooperatives to suffer more from the trade-off compared to NGOs.

H3: Banks, non-banks financial institutions and cooperatives are more profitable and suffer more on the tradeoff between profitability and outreach compared to NGOs.

In addition to these main hypotheses, it is important to remember that regional differences bring a lot of complication to the study. The trade-off effects are not expected to be the same in different regions where environment and amount of the poorest people are totally different.

7. Empirical methodology and data

I start my empirical analyses by introducing six different regression equations that I use to study profitability and outreach of the institutions. Equations 1-3 research the Hypothesis 1

followed by the Equations 4-6 that concentrate on the Hypothesis 2. In addition to base equation, I am able to study the effect of each institution type be using linear combination model (UCLA, 2012). By studying the linear combinations, I am able to test the null hypothesis that the effect of specific variable is zero when each institution type is one. Through this method, I am able find out the effect of each institution individually and not only compared to omitted category. The effect of the institution type, Hypothesis 3, is studied through all these regression equations. In addition, I run oneway ANOVA tests and Bonferroni, Scheffe, and Sidak multiple comparison tests to investigate the differences between institution types more closely. All the variables used in the equations are introduced in more detail in the Chapter 7.4.

7.1. Regression equations

I start my regression analyses by studying the profitability function of the institution as follows:

$$Profitability_i = \alpha + \beta 1Yield_i + \beta 2Type_{ij} + \beta 3Yield_i * Type_{ij} + \beta 4Personnel\ Cost_i + \beta 5Personnel\ Cost_i * Type_{ij} + \beta 6Total\ Cost_i + \beta 7Total\ Cost_i * Type_{ij} + \beta 8Age_i + \beta 9Size_i + \beta 10Orientation_{ij} + \beta 11Region_{ij} + \varepsilon_{ij} \quad (1)$$

In the equation, i refers to different time periods and j to different variables inside the category. Profitability is measured by financial self-sufficiency (FSS), return on assets (ROA) and profit margin (Profit). Institution type is divided to four different categories: banks, non-bank financial institutions (NBFIs), cooperatives/credit unions and non-governmental organizations (NGOs). Banks is used as an omitted category due to the fact that it is the most commercialized category. My study concentrates on the commercialization. By using the banks as a reference category, I am able to study if the effect is visible and significant in the most obvious category. After that I am able to study, whether some other form of institution type would affect positively into the equation. It is not feasible to assume that the institution type would only change the intercept of the regression line and therefore I use the slope/interactive dummy variables.

In the Equations 1, 2 and 3 the orientation matrix includes three different variables that describe the institutions business practices. Variables are the ratio of loans to assets, the average loan size (relative to GNP per capita) and the formal profit status. The formal profit status is a dummy variable. The region variable includes dummy variables for each of the region. Latin America is the omitted category due to having most of the observations.

Dougherty (2007) recommends to select the most dominant or normal category as a reference category.

After conducting the first regression equation, I also include yield squared and its interaction terms to the equation to be able to study the effect of interest rates more carefully. In the Equation 2, I test the impact of rising interest rates. I study whether there is some threshold level for rising interest rates. I have not included the interaction terms with institution type and personnel/total cost into the reported equations and results, because adding those terms does not improve the explanatory power of the equation. The Equation 2 is as follows:

$$Profitability_i = \alpha + \beta 1Yield_i + \beta 2Yield\hat{}2_i + \beta 3Type_{ij} + \beta 4Yield_i*Type_{ij} + \beta 5Yield\hat{}2_i*Type_{ij} + \beta 6Personnel\ Cost_i + \beta 7Total\ Cost_i + \beta 8Age_i + \beta 8Size_i + \beta 9Orientation_{ij} + \beta 10Region_{ij} + \varepsilon_i. \quad (2)$$

Following to the Equation 2, it is clear that interest rates are an important factor affecting the profitability. I replace profitability by the portfolio quality in the Equation 3 to study if the declining profitability is due to worse portfolio quality. I measure the portfolio quality with the PaR30 ratio, loan loss ratio and write-off ratio with the following equation:

$$Portfolio\ quality_i = \alpha + \beta 1Yield_i + \beta 2Yield\hat{}2_i + \beta 3Type_{ij} + \beta 4Yield_i*Type_{ij} + \beta 5Yield\hat{}2_i*Type_{ij} + \beta 6Personnel\ Cost_i + \beta 7Total\ Cost_i + \beta 8Age_i + \beta 8Size_i + \beta 9Orientation_{ij} + \beta 10Region_{ij} + \varepsilon_i \quad (3)$$

After understanding the profitability of the institution, I start to consider outreach of the institution and explore the Hypothesis 2. The Equation 4 for the trade-off between profitability and outreach is as follows:

$$Outreach_i = \alpha + \beta 1Profitability_i + \beta 2Type_{ij} + \beta 3\ Profitability_i* Type_{ij} + \beta 4Age_i + \beta 5Size_i + \beta 6Control_{ij} + \beta 7Region_{ij} + \varepsilon_i \quad (4)$$

Outreach is measured with two different proxies that are the average loan balance and the percentage of women borrowers. In the Equations 4, 5 and 6, the control variable matrix includes the loans to assets ratio, profit status dummy variable and the portfolio quality variable. These variables are expected to have impact on outreach and therefore those need to be included to obtain as appropriate results as possible. Otherwise components are similar to described above.

After doing the basic outreach regression, I want to study the complementary effect with age and size. Two last equations therefore investigate the effect of maturity and size of the institutions. Equations are following:

$$Outreach_i = \alpha + \beta 1 Profitability_i + \beta 2 Type_{ij} + \beta 3 Age + \beta 4 Profitability_i * Type_{ji} + \beta 5 Age_i * Type_{ij} + \beta 6 Profitability_i * Age_i + \beta 7\ Profitability_i * Type_{ji} * Age_i + \beta 8 Control_{ij} + \beta 9 Region_{ij} + \varepsilon_i \quad (5)$$

$$Outreach_i = \alpha + \beta 1 Profitability_i + \beta 2 Type_{ij} + \beta 3 Size_i + \beta 4 Profitability_i * Type_{ji} + \beta 5 Size_i * Type_{ij} + \beta 6 Profitability_i * Size_i + \beta 7 Profitability_i * Size_i * Type_{ij} + \beta 8 Control_{ij} + \beta 9 Region_{ij} + \varepsilon_i \quad (6)$$

Variables are similar as described in the Equation 4. Based on these six regression equations, I will accept or decline my hypotheses described in the previous section. I run several regressions for each of the equations to be able to scrutinize the individual and pooled effects of each of the variables used.

7.2. Regression estimators

This paper uses pooled Ordinary Least Squares (OLS) and traditional panel data methods to study the profitability and outreach. The results are similar with different equations and estimators. When judging between different estimators, panel data estimator is superior to pooled OLS because it takes time dimension of the data into account. Due the non-linearity of the data, time invariant explanatory variables and heteroscedasticity problems, random-effect estimator is the most appropriate estimator. I have conducted the analyses for all of the equations by different methods, but mostly random effects model results are reported. In this section, I go through the different methods and explain why the random effects model is the best fit for my study.

7.2.1. Linear estimator

I start the analyses with the linear ordinary least squares (OLS) model. OLS is a statistical technique that minimizes the sum of the squared deviations between a dependent variable and one or more independent variables. Linear estimator can be used to show the direction of my study, but at later stages, it is not the most efficient estimator. I expect that my variables could have concave relation instead of linear and therefore the linear estimator would not result sufficient conclusions. In addition, linear model won't capitalize the time dimension of the data which indicates that panel data methods would be better for a large data set for multiple

years. Dougherty (2007) explains that very common problem with linear models is fitting of models with cross-sectional data sets that could cause bias due to unobserved heterogeneity. Some of the dynamics in the data are detected with cross-sectional data and therefore panel data approach could better reveal the dynamics.

Regardless of these reasons, I run OLS regression and test its appropriateness. I start with linear regression with estimator that is robust to certain types of misspecification as long as the observations are independent. If the variations for each MFI are so small that pooled regressions suffice, I would use pooled OLS instead of panel data estimations. ANOVA (Analyses Of Variance) is the statistical technique for comparing means for multiple independent populations. I therefore test the equality of the population means. The null hypothesis of the test is that the regression slopes are homogeneous for all individual MFIs at all times. Based on the results of F tests at 5 % significance level, I reject the homogeneity assumption and conclude that the pooled OLS regression is inappropriate. I proceed with my analyses with the panel data estimation similarly to Mersland and Strøm (2010).

7.2.2. Fixed effects estimator

The dynamic panel data approach offers advantages to OLS and therefore I run the regression with traditional panel data methods, fixed effects and random effects estimators. One assumption for panel-data estimators is that the idiosyncratic errors must be homoscedastic and uncorrelated across time. If assumption does not hold, estimator will be inefficient and biased.

In the fixed effects estimator I would like to take into account unobserved institution specific variables (e.g. management capacity) that has an impact on regression. This could be done by estimating parameters based on the institution. When using the fixed effects estimator, I assume that something within the institution may impact or bias the predictor or outcome variables. Therefore there is assumed to be correlation between institutions error term and predictor variables. Fixed effects estimator removes the effect of those time-invariant characteristics from the predictor variables so it is possible to assess the predictor's net effect (Torres-Reyna).

When choosing the appropriate fixed effects estimator, I need to reject within-groups fixed effect method and first difference fixed effects method. Those seem appealing, because unobserved heterogeneity disappears. The fixed effects panel data estimation amounts to

subtracting the individual MFI averages from the annual observation, and performing regression on these transformed variables. The procedure removes individual MFI heterogeneity, since fixed effects are assumed constant during the observation period. Thus, the fixed effects are removed together with the constant. Nevertheless, the intercept and any x variable that remains fixed for each individual will disappear from the model (Dougherty, 2007). In the other words, the problem with the model is that both intercept and the any x that remains constant will drop out of the model. As Hartarska and Nadolnyak (2007) also state, a major shortcoming of the fixed effect model is that it cannot accommodate time invariant variables. This is very serious disadvantage, because variable for institution type is mostly fixed for span of time and therefore these methods cannot be used for my study. As Mersland and Strøm (2010) state using the time invariant variables gives some restrictions on methods used. The third common version of the fixed effect approach is known as the least squares dummy variable regression (LSDV) model. In the model unobserved effect is brought explicitly into the model. Formally, the unobserved effect is now being treated as the coefficient of the individual-specific dummy variable (Dougherty, 2007). LSDV may not be feasible if we have large amount of parameters (Mycielski, 2007).

I therefore try to use the feasible generalized least squares method (FEGLS). I prefer using FEGLS to correct serial correlation and heteroscedasticity. In theory, this regression method is similar to OLS if error terms are not correlated, because it only controls the unobserved effects that have an impact on error terms not to estimates. Therefore it does not fully control fixed effects, but in reality taking into consideration the correlation between error terms causes results closer to fixed effects than OLS. The method should be more appropriate compared to normal pooled OLS because taking into account the correlation in the error terms drives the results closer to fixed effects estimation. Nevertheless, the GLS method won't take into account the unobserved effects to estimates.

I would like to consider the institution specific variables. Nevertheless, I have very large data set with almost 800 institutions; it is not feasible to create dummies for each of the institutions for all the time periods. Nevertheless, I am able to test the fixed effects estimation by running the regression for the biggest geographical area that is Latin America and Caribbean. I add the institution specific dummies to this regression. Due to these changes, I am able to test the fixed effect model and run the directional Hausman test as explained in the paragraph "*7.2.4. Defining the appropriate estimator*".

7.2.3. Random effects estimator

Dougherty (2007) explains that random effects estimator expects unobserved effects to be normally distributed and they cannot be correlated with the regressor. The main benefit with the random effects estimator is that it permits time-constant variables which enable to study of the institution types. Difference to fixed-effect estimator is that the random-effects estimation is performed assuming that the fixed effect error is part of the error term (Mersland and Strøm, 2010). Due to the disadvantages of the fixed effects estimators, it seems that the random effects model is the only possible estimation technique to get proper results. To correct heteroscedasticity and serial correlation in the random effects-estimator, it is estimated using White´s robust standard errors.

7.2.4. Defining the appropriate estimator

As explained earlier, panel data have many advantages and it should be used for the study. In addition, it seems that fixed effects estimator is not suitable for this research indicating that random effects estimator could be the one to use as used also by Merland and Strøm (2009). I still run some tests to test and confirm the most appropriate method.

Fixed effects and random effects estimators are different in a way that fixed effects estimator allows the unobserved effects to be correlated with the regressor. Random effects estimator expects unobserved effects to be normally distributed and they cannot be correlated with the regressor. Fixed effects estimator is always consistent but if the unobserved effects are correlated with the observed regressors, random effects estimator is not consistent. If the unobserved effects are not correlated, both estimators are consistent, but random effects estimator is more efficient. After approximating both models, it is important to define which one is more reliable. Dougherty (2007) explains that random effects estimator is more attractive, because observed characteristics that remain constant for each individual, are retained in the regression model. On contrary, in fixed effects estimation they have to be dropped. The other reason to prefer random effects-estimator is that I do not lose n degrees of freedom. Random effects estimator has two preconditions: (1) observations should be drawn randomly from the population and (2) unobserved effect need to be distributed independently of the X_j variables. If preconditions are violated, fixed effects estimator should be used. The first condition is met in my data, but the appropriateness of the second can be tested by Hausman test through examining if the unobserved effects are not correlated with the

regressor. If they are not violated, random effects estimator could be used and it gives more efficient estimates.

After conducting the fixed effect and random effect regressions, I see that there are no large differences in results, which would indicate that the random effects regression could be more appropriate estimator to use. In addition, I would like to run the Hausman test for both profitability and to outreach equations. The null hypothesis is that the observations are distributed independently of the Xj. If this is correct, both random and fixed effects are consistent, but fixed effects is inefficient, because it involves estimating an unnecessary set of dummy variable coefficients. If the null hypothesis is false, the random effects estimates will be subject to unobserved heterogeneity bias and will therefore systematically differ from the fixed-effect estimations.

In this paper Hausman test cannot be processed in a normal way. Using White´s robust standard errors in random effects estimator is in conflict with the basic assumptions of the Hausman test. Using White´s robust standard errors already admits that I am not dealing with the model in which the unobserved effects are not correlated. Hausman test cannot be used because I should be comparing consistent estimator to potentially inconsistent one. In this regression, with White´s robust standard errors in random effects estimator, neither of the estimators is consistent. I prefer taking into account the heteroscedasticity existing and therefore I use White's robust standard errors. Thereupon, Hausman test cannot be performed. To be able to run the directional Hausman test, I will run the random effects regression without White's robust standard errors. Due to the large data set, I am not able to run fixed effects regression with institution fixed effects for the whole data set. Due to this reason, I run the regressions only for LAC area in a way that I can include institution fixed effects into the equation. In profitability regression, Hausman test results value 8.81 (degrees of freedom 18) and for outreach regression value 8 (degrees of freedom 12). This means that I can accept the null hypotheses and both methods are consistent but a fixed effect is inefficient, because it involves estimating an unnecessary set of dummy variable coefficients.

The Hausman test results are only directional but clearly confirm my hypotheses and earlier researches that the random effects estimator would be the most appropriate method to use. Due to the institutional type invariant, large data set, similar results in fixed effect and random effects estimator and directional Hausman test results, random effects model seem to be the best choice.

7.3. Data description and limitations

The data used is collected from MixMarket which is publicly available data set from www.mixmarket.org. Microfinance Information Exchange (or the MIX) is a non-profit private organization that aims to promote information exchange in the microfinance industry. Database includes more than 2000 MFIs in the developing world. MFIs can voluntarily participate in the MixMarket database, but data entry is closely monitored by MixMarket. Participants have to enclose documentation that supports the data, such as audited financial statements and annual reports. The financial, social and operational information featured on each MixMarket profile is directly reported by that institution or affiliated network and/or gathered from the institutions' publications (i.e. annual report). MIX analysts validate all data received and standardize according to International Financial Reporting Standards (IFRS). The MicroBanking Bulletin provides additional information and adjusts the financial data to ensure comparable results. Participating MFIs typically have three characteristics: First, they are willing to be transparent by submitting their performance data to an independent agency. Secondly, they display a strong social orientation by providing financial services to low-income persons. Thirdly, they are able to answer all the questions needed for the analysis. (Microfinance Bulleting, 2010)

MFIs that report data to MIX are awarded diamonds based on their level of transparency and reliability: the higher the number of diamonds, the higher the level of transparency. MixMarket puts the reporting MFIs into five categories. Institutions rated four-diamond and higher have financial statements audited by a third-party accounting firm or similar (MicroBulletin, 2010). I have decided to use only four-and five-diamond rated institutions to ensure the appropriate data input.

My data covers years from 1995 to 2011 and includes microfinance institutions that report to MIX and have sufficient amount of data available. I started my analyses with 1844 MFIs from different parts of the world. I sorted data out by including only observations of annual data, only observations reported in USD and only over 4-diamond rated MFIs. After these adjustments, I had 842 institutions but I left out institutions that belong to rural bank category. These institutions are often government owned and the sample size is so small that it includes too many exceptional values. After these changes, my data included 799 institutions and 6039 observations. I deleted the largest outliers and I was left with 795 institutions and 5924 observations from 96 different countries. The data set is larger compared to earlier studies

conducted on the topic. Table 1 shows that there are observations from all the years 1995-2011, but the earlier years have few observations. The majority of the observations are from 2003 to 2011.

Table 2
Number of observations per year
The table shows the number of observations per year. Most of the observations in my sample are from the years 2003 to 2011. Therefore the recent years are more dominant in my sample.

Year	-95	-96	-97	-98	-99	-00	-01	-02	-03	-04	-05	-06	-07	-08	-09	-10	-11
# of observation	2	21	38	67	95	135	172	260	363	451	524	573	632	697	743	748	390

There are some limitations in MixMarket dataset. First of all, there is no comparable dataset that would be universally acceptable and cover the whole microfinance world. Therefore the institutions in this paper are selected based in large part on the quality and extent of their data. The data set is thus not representative of all microfinance institutions. Nevertheless, Honohan (2004) finds that the largest 30 microfinance institutions account for more than 90 percent of the clients served worldwide by the 234 top firms. I am not able to do similar comparison here but the evidence suggests that during the sample period the institutions here served over half of all microfinance customers worldwide. Cull et al. (2007) made the similar reasoning based on the Honohan´s findings. Other limitation is that there may be a large firm bias since many small firms are not included into the MixMarket dataset. MFIs that are included into the database need to have adequate information infrastructure to be able to provide necessary data. This leads into the conclusion that MixMarket database probably represents a random sample of the best managed MFIs in the world. Nevertheless, it does not include any informal channels of microloans that are very common in developing countries. Those are impossible to take into account with the worldwide dataset because it would require poll where loan channels would be asked from individual people. The advantage of this data is that much background "noise" such as very small MFIs or small development programs without intention to apply microfinance in a business-like manner have been filtered out. This allows for more realistic comparisons of institution types as Mersland and Strøm (2008) explain.

7.4. Variables used in the regression

I use new set of variables compared to earlier studies. I first study the profitability function of the institution followed by the outreach model. In the following paragraph, I go through the variables and their expected effect on profitability and outreach.

Profitability (OSS, ROA, Profit) is the dependent variable in the profitability function and the main explanatory variable in the outreach equation. Profitability is measured with three different indicators that are operational self-sufficiency (OSS), return on assets (ROA) and profit margin (Profit). Financial self-sufficiency (FSS) is also a very commonly used indicator, but I have decided to use OSS for two following reasons. First, FSS includes a cost for own funds of the MFI by applying the inflation rate to own funds (Crombrugghe, Tenikue and Sureda 2008). Second, as Hartarska and Nadolnyak (2007) present, since the donors monitor MFIs' OSS and can exercise long-term control due to increased competition for donations, OSS is likely to be more reliable approximation of financial sustainability of an MFI than FSS. OSS, ROA and profit margin are studied in separate regression holding other variables constant. It seems that OSS has the most of the data (less missing observations) in my sample and it has been the proxy for profitability in many other studies. If the tradeoff hypothesis would hold, profitability would have negative impact on the outreach equation.

Outreach (ALB, Female) is the main dependent variables in the outreach function and the control variable in the profitability function. It is measured with two different proxies; average loan balance (ALB) and the proportion of the female borrowers (Female). Average loan balance is commonly used measure for the outreach also in the other studies (e.g. Schreiner, 2002; Cull t al. 2007; Mersland and Strøm, 2010).

Real gross portfolio yield (Yield) measures the interest rates and is one of the explanatory variables in the profitability function. I use real gross portfolio yield as a measure of interest charges faced by customers since it captures both direct interest charges and any additional fees charged by lenders. Loan losses are not netted out of the revenues, the measure captures the ex-ante interest rate charged by the lender rather than the ex-post interest realized on the portfolio (Cull et al. 2007). For example Kar (2011) finds out that the portfolio yield is positively and significantly related with both measures of financial self-sufficiency which suggest that higher interest rates improve financial performance. That is also expected result in my equation.

Real gross portfolio yield squared (Yield^2) is one of the main explanatory variables in the profitability function. It is expected to have negative coefficients indicating a non-linear association that MFI profitability and sustainability first increases, and then decreases with interest rates. Interest rates are crucial factor in regards the agency theory. When lenders face informational asymmetry and borrowers lack collateral, charging interest above certain

threshold could aggregate problems of adverse selection and moral hazard. At high enough rates, only low-quality borrowers that do not expect to be able to repay would find it in their interest to borrow. If the conjecture is true, microbanks charging high interest rates should expect to face lower repayment rates and profitability (Cull et al., 2009).

Institution type is the main interest of the study and it is as an explanatory dummy variable and constitute for the interaction terms throughout all the equations. I have created dummies for non-bank financial institutions (NBFI), non-governmental organizations (NGO) and cooperatives/credit unions (Coop). Banks are the omitted category. These institutional types are specified more carefully in the literature review section. Institutional type in one of the interests of my study and the Figure 4 illustrates the amount of different institution in the sample. It can be seen that NGOs are the biggest institutional type (47 %) even though NBFIs are almost at similar size both amounting approximately 40 percentages. Cooperatives/credit unions and banks both form a little over 10 percentages of the sample.

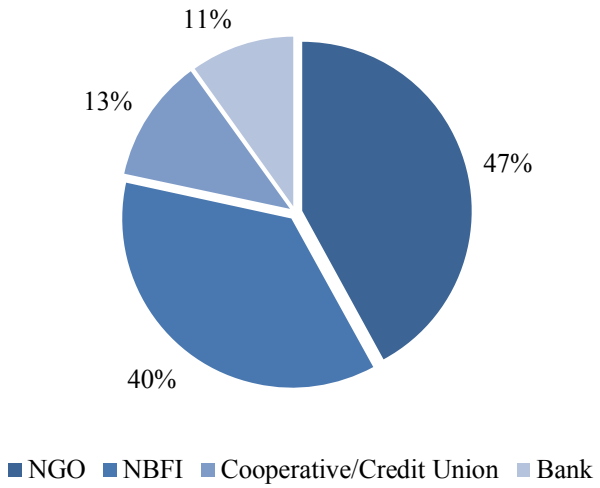

Figure 5
Division between institution types
The figure represents the percentage part of each institution type in my sample. NGOs combine almost half of the institutions (47%) whereas NBFIs are 40 % of the sample. Cooperatives and credit unions each form 13 % of the institutions.

Age is classified in MIX benchmark tables into three categories (new, young and mature) based on the maturity of their microfinance operations. This is calculated as the difference between the year they started their microfinance operations and the year of data submitted by the institutions. Age is expected to have a positive effect on profitability and negative effect on outreach. The claim is that when MFIs get older, the focus for poorest decreases and more effort is put towards the more well-off poor. Including age allows for the possibility to test the hypothesis that more experienced and older MFIs would be more efficient and therefore profitable. There is also an alternative hypothesis that newer institutions have been able to adapt new interventions and technologies from the beginning and therefore have more efficient operations and are able to achieve profits (Mersland and Ström, 2010). Due the

importance of the age variable I also include the multiplicative interaction terms (Equations 5) of age, institution type and profitability to do the through analyses of the age variable.

Size is measured with the size of the gross loan portfolio similarly to Cull et al. (2007). Size is explanatory variable in both of the equations. It is expected that larger institutions are more profitable and therefore the relation between size and profitability is expected to be positive. If gross loan portfolio increases in the average loan size but no increase in the number of borrowers, outreach of the institution would decline. If number of borrowers increases accordingly, outreach would stay at the same level. Therefore the effect of size can be either neutral or negative to outreach. Size is similar factor with age, that suggest that less outreach and better profitability will follow when institution grow and mature. I also create multiplicative interaction terms for profitability, institution type and size in the Equation 6 and expect to find out similar results with the age.

Loans to Assets (LtA) ratio is measured as a loans divided by assets. It is used in both of the equations and is expected to have positive effect on profitability and outreach. The measurement indicates how big proportion of the institutions assets is tied up to its loan portfolio. Ylinen (2010) explains that it can reveal institutions behavior regarding outreach. If the ratio is high, it would mean that the MFI focuses on credit products and searches efficiency through its core products. On the other hand, low ratio may indicate that credit is only side product and in that case, there won't be that much focus on efficiency or profitability.

Profit status (PStatus) reveals whether the institutions are registered as for-profit or not-for-profit institutions. Profit status is s control variable in both of the equations. For-profit institutions are expected to have higher profitability and lower outreach compared to non-for-profit institutions. In my data, I have 316 institutions (40%) that are reported to be for profit organizations and 479 (60%) non-for-profit institutions. Profit status often reflects well if the institution is regulated as well. In regards the regulation, 426 (54%) institutions are regulated in my data set. Profit status won't necessarily reflect to actual profitability of the institutions. Cull et al. (2009) found out that most of the institutions in the data that have total revenues exceeding total costs in fact have "nonprofit" status. These institutions are earning profits in an accounting sense but "non-profit" status institutions cannot distribute profits to investors. This is an important notation because it means that microfinance industry's drive towards profitability does not necessarily imply a drive towards commercialization.

Total expense ratio (TEtA) measures total expenses including personnel and capital costs compared to total assets. It is used as a control variable in both of the equations. Total expense ratio is expected to have negative effect on profitability.

Personnel costs (PEtA) are measured relatively to total assets and are expected to affect positively on the profitability of the institution. This is due to fact the often better employees need to be paid more. Good employees on the other hand improve the profitability and efficiency of the institution. Identifying the credit-worthy borrowers is personnel-intensive. Once identified, such borrowers receive larger loans which makes this strategy cost-effective (Cull et al., 2007).

Portfolio quality (measured with PaR30) captures the accounting convention that loans exceeding 30 days overdue respectively cause an unacceptably high risk of non-repayment. PaR30 enters as an explanatory variable in the profitability regression and is hypothesized to be inversely associated with profitability. After studying the effect of profitability, I also run the regression to study the effect of rising interest rates to the portfolio quality. In that equation, PaR30 is the main dependent variable with the loan loss ratio and write-off ratio. I take risk into account also in the oureach regression as a control variable similar to Mersland and Oystein (2010). They also explain that the risk prediction in the equation is not clear-cut. First of all, higher risk per customer may lead to a greater trade-off because that institution may favor higher loans to members of society who are better off. However, risk prediction hypotheses could also result in the opposite prediction. When risk per customer increases, that MFI would like to reduce the average loan size to limit the risk exposure to particular customer.

Loan loss ratio (LLR) and write-off ratio (Writeoff) are used as an alternative measurement for portfolio quality. Loan loss ratio is calculated by subtracting the value of loans recovered from the write-offs and dividing the product by the average gross loan portfolio. The write-off ratio is the total amount of loans written off during the period. A write-off is an accounting procedure that removes the outstanding balance of the loan from the loan portfolio and from the impairment loss allowance when these loans are recognized as uncollectable. Standardized policies are applied for loan loss provisioning and write-offs because MFIs vary tremendously in accounting for loan delinquency. Microfinance Bulletin explains that some count the entire loan balance as overdue the day a payment is missed. Others do not consider a loan delinquent until its full term has expired. Some MFIs write off

bad debt within one year of the initial delinquency, while others never write off bad loans, thus carrying forward a defaulted loan that they have little chance of ever recovering. In Microfinance Bulleting any loan with a payment over 90 days late is classified as "at risk". They provision 50 percent of the outstanding balance for loans between 90 and 180 days late, and 100 percent for loans over 180 days late. Some institutions also renegotiate (refinance or reschedule) delinquent loans. These loans present a higher probability of default and all renegotiated balances are provisioned at 50 percent. If there is adequate information, Microfinance Bulletin adjusts to assure that all loans are fully written off within one year of their becoming delinquent. In most cases, these adjustments are a rough approximation of risk. Most participating MFIs have high-quality loan portfolios, so loan loss provision expense is not an important contributor to their overall cost structure.

Region is taken into account with different dummy variables, because differences between continents are remarkable. Regions are divided to four different categories that are Latin America and Caribbean (LAC), Asia, middle (North Africa, Europe and Middle East) and Africa with the 41 % 34 %, 25 % and 11 % proportions respectively as shown in the Figure 5. Microfinance differs in different geographical locations due to the growth rates, inflations, interest rates, regulatory issues, percentage of the poorest people, cultural factors, availability of capital and many others. There are also differences relating to profit status of institutions in the different regions. In Africa only 11 % of the institutions are for-profit. The corresponding numbers in the other regions are that in LAC 33 %, Asia 29%, in the middle region 26%.

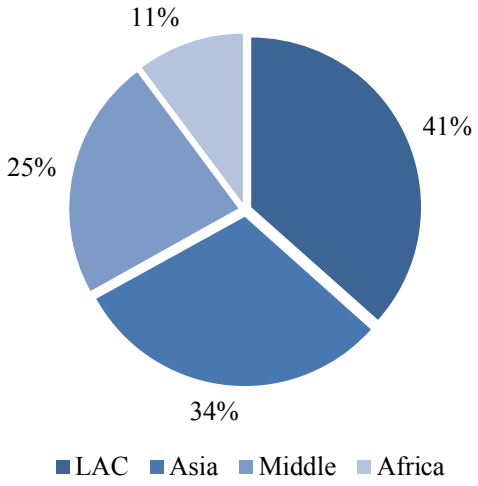

Figure 6
Division between geographical areas
The figure represents percentage of institutions in each region in my sample. LAC (Latin America and Caribbean) is the largest region with 41 % of the institutions, whereas Asia has 34 % of the institutions. Middle region includes 25 % of the institutions and Africa 11 % of the institutions.

After describing the variables, I present number of observations, mean, median, standard deviation, minimum and maximum values for all the main variables in my regressions in the Table 3. The number of observations varies between the variables since I use unbalanced

panel data. For most of the variables, the mean and median values are quite similar indicating that the most exceptional values have been eliminated from my sample. Standard deviations are large for average loan balance and size of the institutions. These results are rational, because sizes of the institutions vary in the microfinance field. The clear differences in the average loan balances of the institutions indicate that this proxy shows considerable differences in outreach of the institutions. Minimum and maximum values show the extreme values that have included to my sample.

Table 3
Descriptive statistics
The table shows that number of observations, mean, median, standard deviation, minimum and maximum values for all the main variables in my regressions. Abbreviations in the table are following: OSS – operational self-sufficiency, ROA – return on assets, Profit – profit margin, ALB – average loan balance, Female – percentage of female customers, Yield – portfolio yield, Writeoff – write-off ratio, PaR30 – portfolio at risk (30days), LLR – loan loss ratio, TeTA – total expenses to assets, PeTA – personal expenses to assets, Size – size of the gross loan portfolio, Age – maturity of the institution, Pstatus – profit status, LtA – loans to assets.

	n	Mean	Median	St.dev	Minimum	Maximum
OSS	5634	1.15	1.12	0.36	0.01	4.79
ROA	5019	0.02	0.02	0.09	-1.23	0.67
Profit	5623	0.02	0.11	0.45	-4.40	1.96
ALB	5733	6.14	6.11	1.32	1.61	11.07
Female	5045	0.67	0.68	0.27	0.00	1.00
Yield	3625	0.25	0.22	0.18	-0.25	1.79
Writeoff	4714	0.02	0.01	0.04	-0.02	1.27
PaR30	5187	0.06	0.03	0.09	0.00	1.00
LLR	4893	0.02	0.00	0.05	-0.29	1.46
TEtA	5018	0.26	0.22	0.15	0.00	1.74
PEtA	4004	0.11	0.08	0.08	0.00	0.83
Size	5896	15.44	15.31	1.98	7.35	22.32
Age	5894	2.49	3.00	0.73	1.00	3.00
PStatus	5896	0.39	0.00	0.49	0.00	1.00
LtA	5836	0.76	0.79	0.17	0.00	2.18

After descriptive statistics, it is also important to study the correlations between the variables. The correlation matrix, in the Table 4, shows that proxies chosen to measure some of the main variables have quite high correlation. The main interest of my study are the profitability proxies and outreach proxies. Regarding the profitability, OSS, ROA and Profit are all relatively highly correlated. Correlations vary from 0.75 to 0.84. Outreach proxies, ALB and Female, are 0.67 correlated. PaR30 that measures the portfolio quality is only 0.25 correlated with the other proxies for portfolio quality. Nevertheless, the other measures for portfolio quality, LLR and Writeoff, are 0.96 correlated. Profitability indicators are all negatively correlated with total expenses and personal expenses showing that higher cost structure decreases the profitability of the institution. Yield is highly correlated with total expenses

(0.72) and personal expenses (0.69). This indicates that institutions that have very high cost structure need to raise their interest rates up to higher levels to be able to cover the costs. On the other hand, if the institution is able to optimize its cost structure, it does not need to raise interest rates to a very high level. In addition, age and size are also correlated by 0.34 showing that older institutions are usually larger in size as well.

Table 4
Correlation matrix
Abbreviations in the table are following: OSS – operational self-sufficiency, ROA – return on assets, Profit – profit margin, ALB – average loan balance, Female – percentage of female customers, Yield – portfolio yield, Writeoff – write-off ratio, PaR30 – portfolio at risk (30days), LLR – loan loss ratio, TeTA – total expenses to assets, PeTA – personal expenses to assets, Size – size of the gross loan portfolio, Age – maturity of the institution, Pstatus – profit status, LtA – loans to assets. Correlations between the profitability proxies are quite high (OSS, ROA and Profit) varying from 0.75 to 0.84. Also the correlation between outreach proxies (ALB and Female) is 0.67. In regards to portfolio quality measures, the writeoff ratio and loan loss ratio has high correlation (0.96), but PaR30 is approximately 0.25 correlated with the other measures. Profitability is negatively correlated with the cost variables (TeTA and PeTA). On the other hand cost variables and yield variables are highly correlated.

	OSS	*ROA*	*Profit*	*ALB*	*Female*	*Yield*	*Writeoff*	*PaR30*	*LLR*	*TEtA*	*PEtA*	*Size*	*Age*	*LtA*	*Yield^2*	*PStatus*
OSS	1.00															
ROA	0.75	1.00														
Profit	0.76	0.84	1.00													
ALB	0.12	0.10	0.15	1.00												
Female	-0.05	-0.02	-0.04	-0.67	1.00											
Yield	-0.02	0.05	0.02	-0.24	0.20	1.00										
Writeoff	-0.22	-0.22	-0.26	-0.01	-0.05	0.18	1.00									
PaR30	-0.19	-0.21	-0.22	0.03	-0.09	-0.05	0.26	1.00								
LLR	-0.19	-0.19	-0.21	-0.04	-0.03	0.18	0.96	0.24	1.00							
TEtA	-0.39	-0.46	-0.42	-0.26	0.19	0.72	0.28	0.07	0.25	1.00						
PEtA	-0.29	-0.35	-0.32	-0.33	0.22	0.69	0.20	-0.01	0.19	0.88	1.00					
Size	0.15	0.17	0.26	0.43	-0.18	-0.19	-0.03	-0.03	-0.03	-0.28	-0.36	1.00				
Age	0.11	0.13	0.21	0.07	0.03	-0.11	0.01	0.10	0.01	-0.16	-0.16	0.34	1.00			
LtA	0.22	0.24	0.25	0.13	-0.01	-0.12	-0.15	-0.10	-0.13	-0.01	-0.01	0.16	0.12	1.00		
Yield^2	0.00	0.03	0.04	-0.11	0.12	0.91	0.15	-0.02	0.12	0.51	0.59	0.00	-0.01	-0.04	1.00	
PStatus	-0.02	0.00	0.00	0.16	-0.10	0.07	0.04	-0.04	0.03	0.06	-0.02	0.27	-0.22	-0.09	0.08	1.00

8. Empirical results

I have conducted many regressions for my six different equations and I present the findings from the most important regressions here. I have also run the oneway ANOVA tests and Bonferroni, Scheffe, and Sidak multiple comparison tests to study differences between institution types more closely. I go through the regressions and interpretation of the results and summarize the main findings in the end of each section. In the Chapter 9, I analyze the results more and draw future recommendations. The regressions use banks as a reference category for the institution types and LAC as a reference category for the geographical regions. In reality, this means that the results reported represent the results specific to those

groups. For this reasons the interaction terms for other groups are added and I also run the linear combinations test to obtain individual effect of each of the variable.

8.1. Profitability

To be able to state whether the aiming to profitability weakens the outreach of the institution, I first analyze the profitability function of the institution and start testing Hypothesis 1. In regards the profitability the results are at the most part as hypothesized and there are differences between institution types. I first analyses the profitability function with three different proxies for profitability. After that I add yield squared terms to the equation to be able to study the effect of raising interest rates to very high levels. I then replace the profitability measures with the portfolio quality measures to study the effect of raising the interest rates even further.

The results of the profitability function are presented in Table 5. The profitability of the institution is studied with three different proxies (operational self-sufficiency, return on assets and profit rate). ROA has the highest total explanation degree (R squared) being close to 75 %. Nevertheless, it seems that the results indicate the same direction throughout the proxies used and there are differences only in magnitudes and in significance levels. In general, it seems that the models fit relatively well based on the R^2 scores and Chi-squared statistics. R^2, the coefficient of determination, is relatively high in my sample. R^2 is the proportion of the total sum of squares explained by the regressions line. It describes how well regression line fits the observations and larger values of R^2 indicate that the model is well specified. Dougherty (2007) states that R^2 seldom being much above 0.5 even in well-specified model and therefore I can be satisfied with the R^2 levels close to 0.6 in most of the regressions.

Yield is positive and significant throughout all the regressions. Also the yield interaction terms with NBFI and NGO are positive and significant when using ROA and Profit as proxies. Therefore the results indicate that the positive effect of high interest rates is even stronger for other institutions than for banks. I want to study the effect for each of the institution type. A linear combination test, in Table 6, shows that the yield improves profitability of each institution type. This result is strong and significant throughout all the institutions in the microfinance industry.

The other important finding in the profitability function is the negative impact of total costs and positive impact of personnel costs on profitability. The magnitude of the total cost seems

Table 5
Results from the profitability regression
The table shows results based on the profitability function of the institution (Equation 1). Abbreviations in the table are following: OSS – operational self-sufficiency, ROA – return on assets, Profit – profit margin, Yield – portfolio yield, Age – maturity of the institution, Size – size of the gross loan portfolio, ALB – average loan balance, LtA – loans to assets, Pstatus – profit status, PaR30 – portfolio at risk (30days), TeTA – total expenses to assets, PeTA – personal expenses to assets. Profitability (dependent variable) is measured with OSS, ROA and Profit. Main interests are the yield, cost drivers (TeTA and PeTA) as well as institution type variables. The regression is run with the random effects method with White's robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OSS	ROA	Profit
Yield	0.726***	0.180***	0.842***
	(5.59)	(6.89)	(5.67)
NBFI	0.027	0.013	-0.069
	(0.35)	(1.03)	(-0.82)
NGO	0.015	0.029**	-0.032
	(0.18)	(1.97)	(-0.32)
Coop	0.018	-0.03**	-0.078
	(0.19)	(-1.95)	(-0.80)
*Yield*NBFI*	0.129	0.176***	0.364**
	(0.86)	(4.55)	(2.07)
*Yield*NGO*	0.092	0.208***	0.700***
	(0.56)	(5.52)	(3.05)
*Yield*Coop*	0.349	0.1	0.252
	(0.96)	(1.37)	(0.83)
Age	0.002	0.006***	0.041***
	(0.13)	(2.65)	(3.58)
Size	0.003	-0.001	0.015***
	(0.56)	(-0.48)	(2.96)
ALB	-0.021*	-0.009***	-0.035***
	(-1.69)	(-4.66)	(-3.04)
LtA	0.589***	0.176***	0.790***
	(9.49)	(16.74)	(10.40)
PStatus	0.033	0.006	0.03
	(0.92)	(1.01)	(0.97)
PaR30	-0.351***	-0.072***	-0.523***
	(-4.23)	(-4.66)	(-3.38)
TEtA	-2.73***	-0.479***	-2.488***
	(-8.16)	(-5.67)	(-6.34)
PEtA	2.559***	0.329**	0.908
	(3.90)	(2.07)	(1.16)
*TEtA*NBFI*	0.743**	-0.11	0.358
	(1.96)	(-1.11)	(0.80)
*TEtA*NGO*	0.816**	-0.246***	-0.188
	(1.87)	(-2.61)	(-0.35)
*TEtA*Coop*	0.115	0.097	0.73
	(0.21)	(0.69)	(1.35)
*PEtA*NBFI*	-2.217***	-0.43**	-0.974
	(-3.26)	(-2.46)	(-1.17)
*PEtA*NGO*	-2.096***	-0.349**	-0.802
	(-2.88)	(-2.02)	(-0.89)
*PEtA*Coop*	-1.687	-0.398	-1.518
	(-1.62)	(-1.57)	(-1.36)
Africa	0.01	0.001	0.047
	(0.31)	(0.17)	(1.64)
Asia	-0.089***	-0.030***	-0.110***
	(-3.69)	(-5.42)	(-3.82)
Middle	0.034	-0.002	-0.027
	(1.23)	(-0.46)	(-1.29)
Cons	1.045***	0.003	-0.310**
	(6.62)	(0.12)	(-2.01)
n	3446	3446	3446
R^2	0.46	0.744	0.609
Wald Chi	589.97	1145.97	549.09
	24.00	24.00	24.00

to be significantly higher compared to the yield coefficients. This indicates that decreasing the total cost is the most efficient way to improve profitability of the institution. Cost reduction leads to improved efficiency that may improve the overall performance of the institution. The positive effect of the increasing personnel costs is interesting factor and due to the importance of well-educated and talented staff for the MFIs' success and profitability.

When studying the regressions further, both total costs and personnel costs have mostly opposite interactions with the other institution types. This depends on the profitability proxy used. The finding means that negative effect of total costs and positive effect of personnel costs are more significant factors to banks' profitability compared to other institutions. Summing the coefficients for the cost terms proves that the effect exists for all the institutions but the magnitude is largest for the banks. Total expenses decrease profitability of all the institution types significantly as seen in the Table 6 with linear combinations. Nevertheless, as seen in the Table 6, the personnel expenses are not significant to any other institution type than for the banks. This may be due the fact, that banks have been able to get the most talented staff through their larger size and international spread and are able to have more efficient operations.

Table 6
Linear combinations for the profitability regression
The table shows the base effect for each of the institution type interaction term without comparing results to the omitted category. The table shows that the positive effect of rising interest rates and the negative effect of total expenses on profitability are significant throughout the institution types. Abbreviations in the table are following: OSS – operational self-sufficiency, ROA – return on assets, Profit – profit margin, Yield – portfolio yield, TeTA – total expenses to assets, PeTA – personal expenses to assets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OSS	ROA	Profit
*Yield*NBFI*	0.854***	0.357***	1.206***
	(11.17)	(12.18)	(12.42)
*Yield*NGO*	0.818***	0.388***	1.542***
	(7.67)	(14.11)	(8.30)
*Yield*Coop*	1.074***	0.281***	1.094***
	(3.17)	(4.04)	(4.06)
*PEtA*NBFI*	0.342	-0.101	-0.066
	(1.42)	(-1.26)	(-0.19)
*PEtA*NGO*	0.463	-0.02	0.106
	(1.34)	(-0.28)	(0.23)
*PEtA*Coop*	0.872	-0.069	-0.61
	(1.07)	(-0.35)	(-0.75)
*TEtA*NBFI*	-1.987***	-0.589***	-2.130***
	(-10.48)	(-10.88)	(-9.31)
*TEtA*NGO*	-1.914***	-0.725***	-2.676***
	(-6.67)	(-16.84)	(-7.10)
*TEtA*Coop*	-2.615***	-0.382***	-1.758***
	(-5.94)	(-3.35)	(-4.63)

When considering the other factors effecting on profitability, age and size both have positive effect. This indicates that older and larger institutions are in general more profitable. Surprising result is that the lower average loan balance improves profitability indicating that giving the smaller loans (better outreach to poorest) would improve profitability of the institution. This is studied more carefully in the Tables 9-10. The loans to assets (LtA) ratio have positive and mostly significant effect. Institutions that are concentrating their efforts mostly on providing loans are able to achieve higher profitability. I also observe that profit status has a slight positive effect but it is not significant for any of the proxies. Nevertheless, it is included to improve the explanatory power of the model as a whole. The PaR30 variable that measures the risk and portfolio quality has a strong negative effect as expected. When it comes to area specific results, Asia has negative and significant coefficients. This means that profitability in Asia is remarkable lower compared to LAC.

After defining the main drivers for profitability, I want to study more carefully how extremely high interest rates may affect to profitability through decreased portfolio quality in the Tables 7-8 and in the Table 14-15 in the Appendixes 1-2. Based on the agency theory, it is expected that when rising to interest rates to very high levels, the problems of adverse selection and moral hazard cause decrease in the profitability of the institution. I study this effect by adding the yield squared term and its interactions. When adding the yield squared terms to the equation, most of the variables remain the same. The regression shows that for banks, profitability is increasing in portfolio yield, but only up to the point at in which the negative quadratic yield coefficient outweighs the positive linear coefficient. Nevertheless, in my sample, this effect is not significant and therefore I am not able to draw unambiguous conclusion on that. In addition, it is not necessarily true for any other institution types. In regards to NBFIs and cooperatives, interactions with yield and yield squared are significant and different compared to banks. To be able to state whether the yield squared increases or decreases the profitability, I run the linear combination tests for this equation as well. As seen in the Table 8, the interactions between yield squared for NBFIs and cooperatives are significant and positive. This indicates that these institutions should increase their interest rates to even high levels to be able to obtain better profitability. Especially for NBFIs, both yield and yield squared interactions are positive and significant indicating the positive effect of raising interest rates to high levels. All the control variables remain similar to profitability regressions reported earlier. In addition, the regional differences remain the same through all of these regressions indicating relatively lower profitability for the institutions in Asia

Table 7

Results from the yield squared regression

This table shows the importance of the rising interest rates to the profitability function of the institution (Equation 2). The table shows whether rising interest rates above certain threshold level effects on the profitability of the firm. Abbreviations in the table are following: OSS – operational self-sufficiency, ROA – return on assets, Profit – profit margin, Yield – portfolio yield, Yield^2 – portfolio yield squared, Age – maturity of the institution, Size – size of the gross loan portfolio, ALB – average loan balance, LtA – loans to assets, Pstatus – profit status, PaR30 – portfolio at risk (30days), TeTA – total expenses to assets, PeTA – personal expenses to assets. Profitability (dependent variable) is measured with OSS, ROA and Profit. Main interests are the yield, yield squared, cost drivers (TeTA and PeTA) as well as institution type variables. The regression is run with the random effects method with White's robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OSS	ROA	Profit
Yield	0.918***	0.275***	1.063***
	(5.44)	(5.44)	(5.63)
NBFI	0.09	-0.007	0.003
	(1.52)	(-0.61)	(0.04)
NGO	0.062	-0.022	-0.106
	(0.83)	(-1.49)	(-1.19)
Coop	0.082	-0.025**	0.043
	(1.10)	(-2.0)	(0.65)
*Yield*NBFI*	-0.405*	-0.044	-0.136
	(-1.84)	(-0.71)	(-0.57)
*Yield*NGO*	-0.222	0.022	0.516
	(-0.76)	(0.26)	(1.24)
*Yield*Coop*	-1.301***	-0.236***	-1.028***
	(-3.28)	(-3.54)	(-3.53)
Yield^2	-0.149	-0.018	-0.149
	(-1.31)	(-0.46)	(-1.27)
*Yield^2*NBFI*	0.572***	0.198***	0.645***
	(3.29)	(3.56)	(3.44)
*Yield^2*NGO*	0.414	0.122	-0.058
	(1.19)	(1.04)	(-0.12)
*Yield^2*Coop*	2.910***	0.838***	2.886***
	(4.69)	(9.58)	(6.29)
Age	0.005	0.006***	0.040***
	(0.40)	(2.63)	(3.58)
Size	0.002	-0.001	0.014***
	(0.37)	(-0.98)	(2.71)
ALB	-0.024*	-0.011***	-0.039***
	(-1.93)	(-5.50)	(-3.41)
LtA	0.597***	0.187***	0.808***
	(9.69)	(18.01)	(10.97)
PStatus	0.023	0.005	0.026
	(0.62)	(0.73)	(0.84)
PaR30	-0.351***	-0.076***	-0.527***
	(-4.12)	(-4.80)	(-3.46)
TEtA	-2.008***	-0.654***	-2.436***
	(-11.21)	(-19.22)	(-11.27)
PEtA	0.411*	-0.077	-0.008
	(1.92)	(-1.44)	(-0.03)
Africa	0.013	-0.002	0.045
	(0.42)	(-0.25)	(1.53)
Asia	-0.097***	-0.035***	-0.115***
	(-3.91)	(-6.25)	(-3.96)
Middle	0.03	-0.003	-0.026
	(1.11)	(-0.67)	(-1.31)
Cons	1.058***	0.07***	-0.245*
	(7.03)	(2.60)	(-1.82)
n	3446	3446	3446
R^2	0.468	0.734	0.616
Wald Chi	444.55	1162.88	509.33
	22.00	22.00	22.00

Table 8
Linear combinations for the yield squared regression
The table shows the base effect for each of the institution type interaction term without comparing results to the omitted category. The results show that rising interest rates effects differently on banks and cooperatives compared to NBFIs and NGOs. Abbreviations in the table are following: OSS – operational self-sufficiency, ROA – return on assets, Profit – profit margin, Yield – portfolio yield, Yield^2 – portfolio yield squared. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OSS	*ROA*	*Profit*
*Yield*NBFI*	*0.513****	*0.231****	*0.927****
	(3.68)	*(6.28)*	*(5.95)*
*Yield*NGO*	*0.696****	*0.296****	*1.579****
	(2.82)	*(4.43)*	*(4.10)*
*Yield*Coop*	*-0.383*	*0.039*	*0.036*
	(-1.06)	*(0.89)*	*(0.16)*
*Yield^2*NBFI*	*0.423****	*0.182****	*0.495****
	(3.24)	*(4.55)*	*(3.34)*
*Yield^2*NGO*	*0.265*	*0.104*	*-0.207*
	(0.80)	*(0.94)*	*(-0.45)*
*Yield^2*Coop*	*2.761****	*0.819****	*2.737****
	(4.52)	*(10.48)*	*(6.15)*

After finding out that the profitability depends on the level of interest rates, I want to research why interest rates have an effect on profitability. Based on the agency theory, the hypothesized reason is that charging too high interest rates decreases the quality of the portfolio. Cull et al. (2007) have found empirical evidence that supports that asymmetric information conclusion. They found out that for individual lenders, the loan delinquency rates increased as interest rates rise. To study the reasons for effect of interest rates, I replace profitability indicators with portfolio quality indicators and results are reported in the Table 14 in the Appendix 1.

Consistent with the agency theory, increasing interest rates to very high levels causes higher PaR30, loan delinquency ratio and loan write-off ratio. In my regressions, when considering only the effect of yield, the results are not significant. Nevertheless, increasing interest rates up to the certain level (yield squared) the portfolio quality decreases. This is significant when portfolio quality is measured with loan loss ratio and write-off and positive in all the cases. These results indicate that interest rates could be raised up to a certain level but rising interest rates above that level decrease the portfolio quality. These findings are consistent with adverse selection: “safe types” choose not to borrow when the interest rate on loans rises above a threshold, leaving a disproportionate fraction of “risky types” in the pool of borrowers. This exacerbates problems with loan repayment (Armendáriz and Morduch, 2010).

Regarding to institution type, the portfolio quality of NGOs and cooperatives is lower compared to banks and NBFIs. In addition, it seems that rising interest rates for very high level is most damaging for the portfolio quality of the banks. When studying the linear combinations in the Table 15 in the Appendix 2, the results are not significant and consistent between any of the institution types. Nevertheless, it seems that for example NGOs, that have lower portfolio quality to begin with, could more easily increase interest rates and still keep portfolio quality at an acceptable level. The result confirms that the negative effect of the rising interest rates is higher in the category of banks.

I have also conducted all these profitability regressions by using only OSS as a dependent variable and adding different variables one by one in the Table 16 in the Appendix 3. This table shows that the main variables remain similar even though the control variables change.

Result 1: *I accept the Hypotheses 1 that the profitability can be improved by decreasing the costs through more efficient operations or by increasing interest rates. Total costs decrease profitability whereas higher personal costs improve profitability level of the institution, especially for the banks. The other way to improve profitability of all the institution types is to raise interest rates. Nevertheless, after a certain level, profitability declines due to decreased portfolio quality. For banks, rising interest rates has more dramatic negative effect on profitability compared to other institution types.*

8.2. Tradeoff between profitability and poverty outreach

As a next step, I move on to the outreach regression to study the trade-off between profitability and outreach to the poor. I run the regression where the outreach is the main dependent variable. Again, I measure the profitability through three different indicators and outreach with two different proxies. As seen in the Table 9, all the proxies provide similar results even though there are differences in magnitudes and significance levels.

For banks, profitability effects on average loan size negatively and significantly throughout all the measures. When the profitability increases, the average loan size decreases and vice versa. In addition, the relationship between profitability and the number of female borrowers is positive and significant in most of the cases. These results indicate that profitable banks are more focused on the poor and women than less profitable banks. This observation is opposite to my initial hypotheses. Throughout all the proxies, profitability effects negatively and

significantly to the average loan size and positively to the proportion of female borrowers when considering the banks category.

Table 9
Results from the outreach regression
This table shows the impact of profitability to outreach of the institution (Equation 3). The regression studies whether there is a tradeoff between being profitable and having a large poverty outreach. Abbreviations in the table are following: OSS – operational self-sufficiency, ROA – return on assets, Profit – profit margin, ALB – average loan balance, Female – percentage of female borrowers, Age – maturity of the institution, Size – size of the gross loan portfolio, LtA – loans to assets, Pstatus – profit status, PaR30 – portfolio at risk (30days). Outreach (dependent variables) is measured with two proxies: ALB and Female. The profitability is measured with three proxies, OSS; ROA and profit margin. The regression is run with the random effects method with White's robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OSS		ROA		Profit	
	ALB	Female	ALB	Female	ALB	Female
Profitability	-0.384**	0.062	-2.218**	0.462**	-0.304**	0.045
	(-2.14)	(1.54)	(-2.49)	(2.16)	(-2.35)	(0.93)
NBFI	-0.562**	0.223***	-0.074	0.149***	-0.056	0.142***
	(-2.46)	(3.40)	(-0.62)	(4.31)	(-0.46)	(4.07)
NGO	-0.493**	0.277***	-0.105	0.243	-0.086	0.232***
	(-2.05)	(3.79)	(-0.63)	(5.33)	(-0.51)	(5.06)
Coop	0.758***	0.141*	0.9***	0.057	0.904***	0.042
	(2.67)	(1.66)	(5.10)	(1.21)	(5.03)	(0.88)
*Profitability*NBFI*	0.451**	-0.071*	2.289**	-0.422*	0.292**	-0.04
	(2.36)	(-1.66)	(2.50)	(-1.93)	(2.12)	(-0.81)
*Profitability*NGO*	0.366**	-0.041	2.244**	-0.41*	0.279**	-0.025
	(2.04)	(-0.94)	(2.53)	(-1.86)	(2.15)	(-0.51)
*Profitability*Coop*	0.146	-0.086	1.836	-0.714**	0.132	-0.044
	(0.68)	(-1.54)	(1.25)	(-2.42)	(0.86)	(-0.78)
Age	0.037	-0.005	0.028	-0.007	0.04*	-0.005
	(1.40)	(-0.64)	(1.02)	(-0.88)	(1.52)	(-0.67)
Size	0.295***	-0.004	0.303***	-0.004	0.296***	-0.005
	(16.78)	(-1.28)	(16.41)	(-1.28)	(16.42)	(-1.54)
LtA	0.059	0.004	0.029	-0.003	0.079	0.001
	(0.58)	(0.15)	(0.27)	(-0.10)	(0.80)	(0.04)
PStatus	0.27**	0.006	0.244**	0.007	0.274**	0.006
	(2.41)	(0.19)	(2.19)	(0.26)	(2.46)	(0.20)
PaR30	0.059	-0.116***	0.15	-0.122	0.057	-0.11**
	(0.52)	(-2.58)	(1.34)	-2.47**	(0.50)	(-2.48)
Africa	-0.826***	0.053*	-0.826***	0.054**	-0.83***	0.054**
	(-7.65)	(1.92)	(-7.55)	(2.0)	(-7.70)	(1.96)
Asia	-1.47***	0.225***	-1.486***	0.227***	-1.486***	0.227***
	(-20.24)	(12.40)	(-20.26)	(12.71)	(-20.59)	(12.54)
Middle	0.562***	-0.11***	0.549***	-0.111***	0.558***	-0.11***
	(6.33)	(-5.07)	(6.13)	(-5.12)	(6.30)	(-5.07)
Cons	2.158***	0.464***	1.677***	0.534***	1.682***	0.551***
	(6.90)	(5.52)	(5.13)	(7.83)	(5.10)	(7.92)
n	5051	4673	4646	4314	5042	4664
R^2	0.601	0.385	0.597	0.399	0.603	0.389
Wald Chi	2391.10	736.72	*2306.6*	775.56	2373.10	*747.85*
	15.00	15.00	*15*	15.00	15.00	*15*

The relationship between the profitability and outreach becomes more apparent when I disaggregate by the institution type. All the profitability measures for other institution types indicate opposite reaction compared to banks. Especially results for NBFIs and NGOs are quite similar in magnitude. Nevertheless, when running the linear combination test in the Table 10, it is apparent that these results are not significant for any of the interactions. The effects are different compared to banks, but the effects themselves are not significant. For cooperatives, the profitability has a negative effect on the average loan balance showing the similar effect as for the banks.

Table 10
Linear combinations for the outreach regression
The Table shows the base effect for each of the institution type interaction term without comparing results to the omitted category. Abbreviations in the table are following: OSS – operational self-sufficiency, ROA – return on assets, Profit – profit margin, ALB – average loan balance, Female – percentage of female borrowers. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OSS		ROA		Profit	
	ALB	Female	ALB	Female	ALB	Female
*Profitability*NBFI*	0.067	-0.008	0.071	0.039	-0.012	0.005
	(0.84)	(-0.61)	(0.29)	(0.79)	(-0.20)	(0.47)
*Profitability*NGO*	-0.018	0.022	0.026	0.051	-0.025	0.019
	(-0.51)	(1.54)	(0.19)	(0.96)	(-0.89)	(1.41)
*Profitability*Coop*	-0.238**	-0.024	-0.382	-0.253	-0.172**	0.000
	(-2.07)	(-0.61)	(-0.32)	(-1.24)	(-1.97)	(0.00)

When considering the other variables, the observations are quite consistent throughout the measures and with my initial hypotheses. The increasing size also increases the average loan sizes and decreases the proportion of female borrowers as expected. The effect of age has the same direction but the results are not significant. Profit status seems to increase the average loan sizes but won't affect to number of female borrowers. It seems that on average for-profit companies offer bigger loans. On the other hand, portfolio quality does not have significant effect on average loan sizes, but it decreases the amount of female borrowers. This finding is consistent with Pitt and Khandker (1998) who show that female are often more credible borrowers. Therefore portfolio risk is smaller if there is a large amount of female borrowers. Based on my data, regional differences are quite significant. It seems that in Africa and in Asia, the outreach is much larger compared to LAC if measured by average loan size and proportion of female borrowers. Both measures are significant throughout all the indicators used. In the middle region, the outreach is significantly smaller compared to LAC region. On important point relating to proportion of women is that the percentage of female clients varies

by region. The highest percentages are in Asia, followed by Africa and LAC and the fewest women are served by microfinance institutions in the middle region (similarly to Karlan and Goldberg, 2007). To sum up, size, age, profit status and portfolio quality all effect negatively on the outreach of the institution.

After finding out that there may not be a tradeoff between profitability and outreach, I still want to study the effect of age and size more closely. I scrutinize the tradeoff equation to see if there would be a larger trade-off while institutions grow and mature. The base of the mission drift hypotheses is that socially oriented institutions drift from their original mission while they become larger and mature. My last equations (Equation 5 and 6) study the interactions between profitability, institution type and age/size.

Because I want to especially consider the effect of the different institution types, I need to make multiplicative interaction terms with the different institution types. Brambor, Clark and Golder (2006) argue that it is important to use interaction models whenever the hypotheses are conditional in nature. I am testing the conditional effect of profitability to outreach depending on the institution type and age and size of the institution. All the constitutive terms have to be included into the interaction model specification. Omitting the constitutive term would lead to omitted variable bias and therefore results biased and inconsistent estimates of the other coefficient of the model (Brambor, Clark and Golder, 2006).

Adding multiplicative interaction terms to the regression leads to more complicated interpretation of the constitutive terms in this model. When adding an interaction term to a model, it drastically changes the interpretation of all the coefficients. Brambor, Clark and Golder (2006) argue that it is essential not to interpret constitutive terms as if they are unconditional marginal effects. Brambor, Clark and Golder (2006) point out that multiplicative interaction models are often flawed and inferential errors are common in many researches. The individual coefficient of this variable should be interpreted in a way, that other factors included into the interaction term would be zero. The coefficients in interaction models no longer indicate the average effect of a variable as they do in an additive model. After adding the interaction terms, the coefficient of individual variable do not anymore express the whole impact of that variable. It represents only proportion that is not included into the interaction term.

Table 11
Results from the outreach regression with the multiplicative interaction terms
This table shows the effect of the interaction terms between profitability, institution type and age (Equation 5) or size (Equation 6). The regression shows whether the institution suffer from the tradeoff between profitability and outreach while they grow and mature. Abbreviations in the table are following: ALB – average loan balance, Female – percentage of female borrowers, OSS – operational self-sufficiency, Age – maturity of the institution, Size – size of the gross loan portfolio. Outreach is measured with two proxies: ALB and Female. The profitability is measured with three proxies, OSS; ROA and profit margin. The regression is run with the random effects method with White's robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Age			Size	
	ALB	Female		ALB	Female
OSS	-0.269	0.079	*OSS*	-0.239	-0.196
	(-0.64)	(0.61)		(-0.22)	(-1.0)
NBFI	-0.619	0.25	*NBFI*	0.518	-0.181
	(-1.26)	(1.42)		(0.43)	(-0.55)
NGO	-0.636	0.291	*NGO*	0.147	-0.302
	(-1.35)	(1.60)		(0.13)	(-0.91)
Coop	-0.191	0.033	*Coop*	-1.171	-0.523
	(-0.34)	(0.16)		(-0.81)	(-1.20)
Age	0.127	-0.003	*Size*	0.337***	-0.034*
	(0.56)	(-0.04)		(5.08)	(-1.84)
*OSS*NBFI*	0.463	-0.099	*OSS*NBFI*	0.387	0.135
	(1.01)	(-0.74)		(0.33)	(0.62)
*OSS*NGO*	0.227	-0.054	*OSS*NGO*	0.23	0.337
	(0.52)	(-0.39)		(0.21)	(1.52)
*OSS*Coop*	0.333	-0.066	*OSS*Coop*	0.621	0.083
	(0.67)	(-0.45)		(0.49)	(0.31)
*OSS*Age*	-0.079	-0.005	*OSS*Size*	-0.014	0.017
	(-0.39)	(-0.10)		(-0.23)	(1.43)
*Age*NBFI*	-0.024	-0.018	*Size*NBFI*	-0.077	0.025
	(-0.10)	(-0.27)		(-1.0)	(1.21)
*Age*NGO*	-0.117	-0.013	*Size*NGO*	-0.065	0.036*
	(-0.50)	(-0.19)		(-0.91)	(1.77)
*Age*Coop*	0.216	0.043	*Size*Coop*	0.107	0.041
	(0.78)	(0.51)		(1.14)	(1.38)
*OSS*Age*NBFI*	-0.009	0.018	*OSS*Size*NBFI*	0.008	-0.013
	(-0.04)	(0.35)		(0.12)	(-0.95)
*OSS*Age*NGO*	0.088	0.01	*OSS*Size*NGO*	0.014	-0.024*
	(0.43)	(0.20)		(0.22)	(-1.75)
*OSS*Age*Coop*	-0.038	-0.006	*OSS*Size*Coop*	-0.025	-0.009
	(-0.16)	(-0.10)		(-0.30)	(-0.50)
Size	0.284***	-0.005*	*Age*	0.034	-0.005
	(17.16)	(-1.66)		(1.29)	(-0.64)
Africa	-0.795***	0.054*	*Africa*	-0.762***	0.062**
	(-7.38)	(1.95)		(-6.89)	(2.19)
Asia	-1.456***	0.223***	*Asia*	-1.438***	0.227***
	(-20.31)	(12.36)		(-20.09)	(12.47)
Middle	0.515***	-0.112***	*Middle*	0.527***	-0.106***
	(5.89)	(-5.19)		(5.94)	(-4.82)
Cons	2.594***	0.464***	*Cons*	1.898*	0.926***
	(5.13)	(2.67)		(1.80)	(3.08)
n	5454	4901	*n*	5454	4901
R^2	0.594	0.368	*R^2*	0.590	0.363
Wald chi	2490.8	717.88	*Wald chi*	2519.07	707.58
	19.00	19.00			19.00

When first studying the effect of age in the Table 9, I found out that there are no significant differences between the institutions while they age. As seen already in the earlier regressions, age does not seem to have significant effect on the outreach of the institution. As seen in the Table 11, the same solution applies to the equation done with the multiplicative interaction terms with age. In regards the size variable the situation is a little bit different. Size has a very strong impact to weakened outreach already in Equation 4 and also in the Equation 5 and 6. It seems that larger institutions have significantly larger average loan sizes as expected. Nevertheless, Table 11 shows that the complementary effect of size, profitability and institution type is not significant. This result indicates that even when the largest institutions aim to profitability, they do not necessarily lose their outreach. The results won't change to any extend even when running the linear combination tests for the equation in the Table 12. All the other variables are as expected in the last regressions as well.

Table 12
Linear combinations table for outreach regression with multiplicative interaction terms
Abbreviations in the table are following: ALB – average loan balance, Female – percentage of female borrowers, OSS – operational self-sufficiency, Age – maturity of the institution, Size – size of the gross loan portfolio. The table shows the base effect for each of the institution type interaction term without comparing results to the omitted category. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Age	
	ALB	Female
*OSS*NBFI*	0.194	-0.020
	(1.09)	(-0.60)
*OSS*NGO*	-0.042	0.025
	(-0.41)	(0.53)
*OSS*Coop*	0.064	0.012
	(0.24)	(0.17)
*OSS*Age*	-0.348	0.074
	(-1.35)	(0.87)
*Age*NBFI*	0.103	-0.021
	(1.05)	(-0.93)
*Age*NGO*	0.01	-0.015
	(0.19)	(-0.68)
*Age*Coop*	0.343**	0.041
	(2.15)	(0.75)
*OSS*Age*NBFI*	-0.151	0.094
	(-0.18)	(0.40)
*OSS*Age*NGO*	-0.054	0.086
	(-0.07)	(0.37)
*OSS*Age*Coop*	-0.180	0.070
	(-0.22)	(0.29)

	Size	
	ALB	Female
*OSS*NBFI*	0.148	-0.061
	(0.32)	(-0.66)
*OSS*NGO*	-0.009	0.141
	(-0.04)	(1.33)
*OSS*Coop*	0.383	-0.113
	(0.56)	(-0.62)
*OSS*Size*	-0.253	-0.179
	(-0.25)	(-0.97)
*Size*NBFI*	0.260***	-0.009
	(6.22)	(-1.03)
*Size*NGO*	0.272***	0.002
	(10.21)	(0.26)
*Size*Coop*	0.444***	0.007
	(6.55)	(0.31)
*OSS*Size*NBFI*	0.107	-0.243
	(0.09)	(-1.08)
*OSS*Size*NGO*	0.112	-0.254
	(0.10)	(-1.13)
*OSS*Size*Coop*	0.074	-0.239
	(0.06)	(-1.07)

Result 2: *I reject the Hypothesis 2 that there is a trade-off between profitability and outreach. Institutions won't drift from their mission and suffer from the larger tradeoff even while they age and mature. Regarding to the institution types, there is no tradeoff for banks and cooperatives. For NBFIs and NGOs, the similar conclusion cannot be drawn, but the results are significant in neither direction. Based on my results, it should be possible to achieve both profitability and large outreach at least for many of the institutions.*

8.3. Institution type

I have studied the institution type through the profitability and outreach regressions. I want to go deeper in my analyses and therefore I run the oneway ANOVA analyses. I do the analyses for the main variables in the Table 13 to observe if there are significant differences between the institution types. As seen last column in the Table 13, most of the F-test values are significant (critical level is 2.70 with 3 degrees of freedom). The significant F values tell that at least one treatment effect differs from zero, i.e. the means are not all equal. Based on the F-values, I am able conclude that there are significant differences between institution types regarding almost all of the variables. It seems that ROA is the only variable that does not have significant differences at 5 % level depending on the institution type.

When comparing the results at the variable level, it seems that there are large variations between different institution types. In regards the profitability indicators, cooperatives and banks have the highest values as concluded also by Lapenu and Zeller (2001). It is expected and rational result that the banks have high profitability since they are the most commercialized form of institution. The finding about cooperatives is aligned with Tchakoute-Tchuigoua (2010) that also find out that cooperatives are more efficient and on average their profitability and sustainability are higher compared to other forms of ownership. NGOs seem to have lowest profitability indicator values as expected.

The main differences in profitability come from the cost structure of the institutions. As seen in the Table 13, the costs are again lowest for the most profitable institutions, banks and cooperatives. Cooperatives have the lowest total costs. In regards the personal costs, banks and cooperatives have again the lower costs compared to other institution types. Also for example Lapenu and Zeller (2001) had a similar finding that cooperatives and banks have high staff productivity compared to other institution type. It was also shown in the Table 4 with the correlation matrix that lower costs are highly correlated with more profitable

Table 13

Oneway ANOVA statistics depending on the institution type

The table shows the mean, standard deviation and the number of observations for each of the variables regarding each of the institution types. In the last column F-statistics based on the oneway ANOVA show if the differences between institution types are significant regarding the variable. The critical level is 2.7 at 5 % significance level and with 3 degrees of freedom. All The significant F values tell that at least one treatment effect differs from zero, i.e. the means are not all equal. Abbreviations in the table are following: OSS – operational self-sufficiency, ROA – return on assets, Profit – profit margin, ALB – average loan balance, Female – percentage of female customers, Yield – portfolio yield, Writeoff – write-off ratio, PaR30 – portfolio at risk (30days), LLR – loan loss ratio, TeTA – total expenses to assets, PeTA – personal expenses to assets, Size – size of the gross loan portfolio, Age – maturity of the institution, Pstatus – profit status, LtA – loans to assets.

	Bank			NBFI			NGO			Cooperative			F-test
	Mean	Std	N	Mean	Std	N	Mean	Std	N	Mean	Std	N	
OSS	1.15	0.28	685	1.15	0.39	1982	1.14	0.36	2423	1.20	0.35	544	3.57
ROA	0.02	0.06	618.00	0.02	0.10	1780	0.01	0.11	2143	0.02	0.05	478	2.29
Profit	0.06	0.32	685.00	0.01	0.47	1981	0.01	0.49	2417	0.09	0.33	540	7.71
ALB	7.06	1.31	666.00	6.23	1.19	2026	5.61	1.18	2475	7.02	1.21	566	393.32
Female clien	0.54	0.25	473.00	0.64	0.26	1799	0.76	0.25	2271	0.50	0.25	502	225.21
Yield	0.19	0.17	415.00	0.29	0.20	1314	0.26	0.16	1557	0.15	0.10	339	78.59
Write-off rati	0.02	0.02	563.00	0.02	0.05	1682	0.02	0.04	2022	0.01	0.01	447	13.05
Par30	0.05	0.07	576.00	0.05	0.09	1875	0.06	0.11	2242	0.06	0.08	494	6.37
llr	0.01	0.02	598.00	0.02	0.05	1734	0.02	0.05	2095	0.01	0.01	466	10.06
Teta	0.21	0.10	618.00	0.28	0.15	1780	0.27	0.15	2142	0.17	0.09	478	117.88
Peta	0.07	0.04	470.00	0.12	0.09	1474	0.12	0.08	1691	0.05	0.04	369	126.77
Size	17.58	1.96	694.00	15.51	1.89	2080	14.86	1.65	2538	15.17	1.91	584	420.11
Age	2.45	0.75	703	2.27	0.80	2081	2.67	0.62	2527	2.53	0.69	583	119.04
Pstatus	0.97	0.18	700	0.77	0.42	2084	0.00	0.07	2531	0.03	0.16	581	4592.49
Lta	0.67	0.21	695.00	0.77	0.17	2057	0.77	0.17	2504	0.78	0.14	580	64.5

operations. As seen in the Tables 5-6, higher personal costs can still improve profitability, especially for the banks. Banks are better able to capitalize of the high quality of the staff.

Yield is another factor effecting profitability. But as seen already in the Table 4 with correlation matrix, yield levels are not that highly correlated with the profitability. Also Table 5-6 show that the magnitudes are much higher for the cost drivers and therefore the effect of interest rates is not that crucial for profitability of the institution. In the Table 13, yield levels are on average much higher for NBFIs and NGOs. These institutions have lower profitability levels. This indicates that those institutions need to charge higher interest rates to be able to cover the costs of reaching customers in a large scale. As seen in the Tables 7-10, especially NBFIs are able to raise their interest up to higher levels without suffering on the declined portfolio quality.

In regards the outreach indicators, NGOs seem to have significantly better outreach compared to any other institution type when measured with average loan balance and percentage of female clients. NBFIs have the second largest outreach with both indicators followed by the cooperatives and finally banks. The average loan balance is smaller for NBFIs and NGOs compared to banks and cooperatives as seen in the Table 13. Proportion of female borrowers seems to be much smaller for banks compared to any other institution types. The finding is aligned with for example Cull et al, (2009) that founds that the average share of women served is substantially lower for commercial microfinance institutions than for nongovernmental organizations.

As studying the size of the institution, banks are the largest group whereas NGOs are on average the smallest one. Nevertheless, NGOs are on average the oldest category and NBFIs the youngest. In regards the profit status the differences are significant, because 97 % of the banks and 77 % of the NBFIs have reported to be for-profit institutions. On the other hand, only 3 % of the cooperatives and 0 % of the NGOs are for-profit institutions. A loan to asset ratio is quite similar to different institution even though significantly lower to banks. It indicates that banks have more other services than loans compared to other institution types.

As stated, there are significant differences between the institution types. However, oneway ANOVA test does not reveal where the differences are. I want to identify the differences and use Bonferroni, Scheffe, and Sidak multiple comparison tests (Williams, R., 2004). Williams (2004) explain that these tests examine the differences between each pair of means. However, just using the 5 % level of significance on a pair by pair basis can be misleading. Many

comparisons are being done and therefore the probability is greater than 5% that some differences could be significant just by chance. These tests therefore apply corrections to the reported significance levels that take into account the fact that multiple comparisons are being conducted (Williams, 2004). Williams (2004) explains that Bonferroni, Scheffe, and Sidak multiple comparison tests tend to be conservative: they reduce the likelihood of rejecting the null when the null is true (reduce the likelihood of Type I error). However, they increase the likelihood of not rejecting the null when the null is false (increase a likelihood of Type II error).

	Bank			NBFI			NGO		
NBFI	OSS	Profit	ROA						
	ALB	**Female**	**Yield**						
	PaR30	Writeoff	LLR						
	Size	**Age**	**Pstatus**						
	TEtA	**PeTA**	**LtA**						
NGO	OSS	**Profit**	ROA	OSS	Profit	ROA			
	ALB	**Female**	**Yield**	**ALB**	**Female**	**Yield**			
	PaR30	Writeoff	LLR	**PaR30**	Writeoff	LLR			
	Size	**Age**	**Pstatus**	**Size**	**Age**	**Pstatus**			
	TEtA	**PeTA**	**LtA**	**TEtA**	PeTA	LtA			
Coop	OSS	Profit	ROA	**OSS**	**Profit**	ROA	**OSS**	**Profit**	ROA
	ALB	Female	**Yield**	**ALB**	**Female**	**Yield**	**ALB**	**Female**	**Yield**
	PaR30	**Writeoff**	LLR	PaR30	**Writeoff**	**LLR**	PaR30	**Writeoff**	**LLR**
	Size	Age	**Pstatus**	**Size**	**Age**	**Pstatus**	**Size**	**Age**	Pstatus
	TEtA	PeTA	**LtA**	**TEtA**	**PeTA**	LtA	**TEtA**	**PeTA**	LtA

Figure 7
The significant differences for each of the variables depending of the institution type based on the Bonferroni, Scheffe and Sidak multiple comparison test
Highlighted areas show that there is significant difference in that variable between two institution types. Abbreviations in the table are following: OSS – operational self-sufficiency, ROA – return on assets, Profit – profit margin, ALB – average loan balance, Female – percentage of female customers, Yield – portfolio yield, Writeoff – write-off ratio, PaR30 – portfolio at risk (30days), LLR – loan loss ratio, TeTA – total expenses to assets, PeTA – personal expenses to assets, Size – size of the gross loan portfolio, Age – maturity of the institution, Pstatus – profit status, LtA – loans to assets.

Actual statistics for the Bonferroni, Scheffe and Sidak test are not reported here because of the limited space. Nevertheless, the Figure 6 shows the main differences between the institution types for each of the variable. In general, it seems that there are differences between each of the institution types. In regards the profitability indicators (first row in each box in Figure 6), it seem that there are no significant differences between banks and NBFIs, NBFIs and NGOs and cooperatives and banks. On the other hand, in regards of the outreach indicators (outreach and female), there exists significant differences between each of the two

institution excluding cooperatives and banks. Cooperatives and banks seem to have a lot of similarities as well as NGOs and NBFIs.

Result 3: *I partly accept the Hypothesis 3. Regarding to profitability, banks and cooperatives are the most profitable institution whereas NGOs have the best levels of outreach. Banks are more sensitive to negative effect of raising interest rates and to positive effect of higher personnel expenses. Banks and cooperatives are less likely to suffer on tradeoff between profitability and outreach compared to NBFIs and NGOs opposite to my initial hypotheses. This is due to cost effective operations of banks and cooperatives.*

8.4. Robustness checks

The main results are done based on the unbalanced panel data method. For the robustness check, I run the regressions based on the smaller sample sizes and also run the regressions with area specific data. I first run the regressions for only year 2010 (the year with most of the observations). As seen in the Table 17 in the Appendix 4, the results are similar to panel data regressions confirming the consistency of my study. The differences are only in the significance levels and in the magnitudes of the coefficient. In regards to the regional differences, it is clear the profitability levels in different regions have shift during the time period. When considering only year 2010, profitability of the institutions in Asia is not negative anymore. Asia has been one of the fastest developing areas during the past ten years and it makes sense that results are very different for the year 2010 than for the 16 years' time spam from 1995 to 2011. The profitability of the institution in the middle region is significantly more positive in 2010 when comparing to LAC. These changes are due to changes in different regions and not to model misspecification.

When running the robustness test for the profitability functions (Equation 1 and 2) with the year 2010 data, the main variables, as the positive effect of yield, are still significant. Some of the control variables are not significant anymore but most of the results are the same with the base regression confirming the robustness of my study. In regards to the outreach regression, the results are similar to ones presented earlier. Only difference in this robustness regression is that cooperatives are more likely suffer from the trade-off between profitability and outreach. Nevertheless, when running the linear combination tests (not reported), the effect is

not significant anymore. Results regarding the regional differences are similar as earlier. It seems that the trade-off is smallest in Africa and Asia and largest in the middle region.

After conducting the first robustness test, I also run the profitability regression (Equation 2) and outreach regression (Equation 4) with the areas specific datasets. The results of the profitability regression are reported in the Table 18in the Appendix 5. I want to study regressions with separate data for each of the continents to see consistency throughout the regions. Unfortunately significance levels of my results are not as high as in the base regression while running the regressions with the smaller sample sizes. In profitability function, the results are similar to base regression indicating the positive effect of increasing interest rates and negative effect of total costs on profitability. Some regional differences are for example that the yield squared term seem to be higher in middle region showing that there it may be profitable to charge extremely high interest rates. Also the positive effect of personal expenses seems to exist only in the more well-off areas including LAC and middle region.

When considering the outreach function (Equation 4) with the area specific data sets in the Table 19 in the Appendix 6, the results are again quite consistent throughout the regions. It seems that Asia is different to other regions when considering the institution types. Banks seem to have worse outreach in Asia compared to other regions. On the other hand, NBFIs and NGOs have better outreach in Asia compared to other regions. Results seem to be consistent with the base regression confirming the consistency of my study even though results vary between the different regions.

9. Recap of the results and discussion

After conducting a large amount of analyses and regressions, it is time to recap the results. Throughout my paper, it has been clear that profitability and outreach are both extremely important targets for microfinance institutions. Fortunately, based on my results, it seems that both of the targets are possible to reach at the same time. Other crosscut theme has been the significant differences in institution types regarding the profitability and poverty outreach. By categorizing results based on the institutional type, the results are more precise and actions are implemented in a more accurate way.

9.1. Profitability is rooted to cost cutting and raising interest rates

I started my analyses by understanding the drivers behind profitability function of the institution that is well predicted by the agency theory. Most of the institutions benefit from increasing the interest rates. On the other hand decreasing total costs is even more efficient way to improve profitability.

Profitability of the institution increases with higher interest rates. Nevertheless, as predicted by the agency theory, if interest rates are rising to very high levels, portfolio quality decreases and profitability starts to decline. Especially for the banks, the profitability starts to decrease, if the interest rates rise to too high levels. Also Cull et al. (2007) have found empirical evidence that for individual lenders, the loan delinquency rates increased as interest rates rise. Individual lenders can be assimilated to banks, NBFIs and cooperatives to large extend. As Cull et al. (2007) explains the safe borrowers choose not to borrow when the interest rates on loans rise above a threshold. This means that only a disproportionate fraction of risky borrowers stays in the pool of borrowers. This exacerbates problems with loan repayment while majority of the borrowers would have higher probability to default.

My results show that increasing interest rates into the high level could be a good opportunity for some of the institutions, especially for NBFIs, if the only target is to improve profitability. As far as the microfinance industry is highly dependent on the subsidies, the profitability is one of the goals, not the only one. Social aspects and poverty reduction should be taken into account as well. Even though the results would suggest increasing the interest rates to very high level for some of the institutions, it should not be done due to the negative overall effect. Microloans are designed to be offered at market rates of interest such that the MFIs can recover their costs but not so high that they make supernormal profits off the poor (Karlan and Goldberg 2007). In reality many institutions receive subsidies and therefore charging very low or high interest rates can distort the market competition (Karlan and Goldberg, 2007). Therefore it is very important not to stare only the profitability indicator when defining the appropriate level of the interest rates.

As mentioned, other important driver for profitability is the cost structure of the institution. When comparing the magnitudes, cost reduction leads to more efficient operations and larger profitability improvement compared to rising interest rates. The finding is aligned for example with Mersland and Strøm (2010), who also state that cutting the costs is the best way to improve profitability. I found similarly to Cull et al. (2011) that nongovernmental

microfinance organizations tend to have higher operating costs, which declines the profitability of these institutions. Banks and cooperatives have the lower operational costs and are also the most profitable forms of institutions. Increasing total costs decrease profitability whereas increasing personal costs improves profitability level of the institution, especially for the banks. Armendáriz and Morduch (2010) state that a great deal what distinguishes failed microfinance from successful microfinance ultimately has to do with management, particularly with how staff members are motivated and equipped to do their jobs. When considering the principal-agent theory modified to management and staff, it is easy to understand that motivating the staff is very crucial to institution's success. Managers should be able to find bet employees and set employee's constraints in a right way. As Armendáriz and Morduch (2010) state that to which extend objectives can be met depend on the constraints set to employees. It is important to do future research how to improve cost structure of the institutions and make operations more efficient and capitalize all the potential benefits from the skilled employees.

9.2. Poverty outreach can be achieved at the same time with profitability

Based on my analyses, it seems that there is no trade-off between profitability and outreach to the poor. The trade-off is smallest or not existing especially for the banks and cooperatives that are also the most profitable forms of institutions. The better profitability and smaller tradeoff are most likely due the more efficient operations of the commercialized institutions. It is aligned with Mersland and Oystein (2010) finding that inefficient MFIs need to shift their loan portfolios toward larger average loans and are then most susceptible to mission drift. They also find that when an MFI increases its cost efficiency, it is better able to advance loans to the poorer members of the community. The results are similar to Schreiner (2002) that finds that self-sustainability approach (instead of poverty approach) produces strongest incentives to improve social benefits through time.

Based on my results, it also seems that while institutions become larger and mature, the effect of profitability on outreach is not significant. This result indicates that mission drift is not apparent and larger and older institutions are not more likely to drift from their missions. Mission drift argument would imply that the older an MFI, the more it drifts towards higher income segments. Nevertheless, my finding is aligned with Mersland and Strøm (2010) statement that MFIs time in business may induce it to accept smaller loan sizes. They also show that the sample average loan size for all MFIs does not increase with MFI age. Mersland

and Strøm (2010) explain two reasons for that: (1) cost effect: operating costs may drop over time as an MFI expends less effort to promote microloans and to ensure their repayment, (2) knowledge effect: repeat relationship with the same customer segment reveals its typical creditworthiness. Due to that, MFI may be willing to extend marginal and smaller loans deeper into a segment with a good record. An experienced MFI is more likely to obtain important customer information. Nevertheless, it is still true that larger institutions have lower outreach indicators. However, based on my study, this is not caused by the fact that they are trying to achieve higher profitability. Even though size and age individually may affect to both outreach and profitability, they won't make the trade-off significantly stronger between the profitability and outreach.

9.3. More commercialized institutions can benefit from their efficient operations while aiming to profitability and large outreach

In regards to institution types, there are a lot of differences. It can be seen that based on the profitability indicators, banks and cooperatives have highest values compared to other forms of institution. Based on the regression results, the constitutional factors of profitability are cost structure and then interest rates. Rising interest rates improves profitability of all the institution types. Rising interest rates improves profitability of the NBFIs and NGOs relatively more compared to banks. In addition, it seems that especially NBFIs can raise interest rates to a higher level without declining profitability. For banks, rising interest rates to too high levels causes the largest negative effect on profitability due to decreased portfolio quality. The reasons behind rising interest rates may be different for different institution types. NGOs often increase interest to be able to reach larger amount of people and being able to function in a rural and more costly areas. In the case of shareholder firms, the drivers behind increasing interest rates are often trying to achieve higher profit levels. As mentioned, larger profitability can be achieved also by cutting the costs. On the cost side, the costs are at the moment lower for banks and cooperatives. Banks are also able to best capitalize funds used for the personal expenses.

When considering the actual trade-off between outreach and profitability, we see that institutional type causes significant differences. For banks, it is possible to achieve high levels of profitability and also the large outreach to the poorest of the poor. Also Tchakoute-Tchuigoua (2010) found out that private microfinance institutions (including banks, cooperatives and NBFIs) are more sustainable than NGOs which is consistent with my

finding. The reason may be that MFIs collecting deposits have higher social performance levels compared to NGOs (Tchakoute-Tchuigoua, 2010). It is due to fact that collection of deposits is a major component for those institutions and increases their capacity to finance investments in lending. In addition, Hartarska and Nadolnyak (2007) explain that one reason why the outreach of the regulated institutions could be better is that those institutions are allowed to collect savings. Savings from richer clients, who bear the fixed costs, make provision of saving facilities to poorer borrowers. Also Mersland and Strøm (2010) have found out that by being more cost-efficient, institutions are able to reach the poorest customers in a larger scale. The commercial approach of microfinance is consistent with the social mission of MFI. This finding is aligned with Cull et al. (2007); Mersland and Strøm (2010) and Tchakoute-Tchuigoua (2010). This could be due to the fact that banks have been able to organize their operations in a more efficient way and therefore are able to achieve high profitability levels without compromising outreach.

For NGOs and NBFIs the effect is not clear and there could be the trade-off between profitability and outreach of the institutions. For the NGOs and NBFIs the case may be that while serving the poorest, the operational efficiency suffers and the profitability declines. NBFIs can improve their profitability by increasing interest rates but they should be careful not to weaken their outreach when aiming to more profitable operations. NGOs are also able to achieve better profitability with higher interest rates but only up to a certain level. They also may have problems obtaining both profitability and outreach. This may be due to the fact that NGOs suffer from weak governance because stakeholders are often passive and only weakly influence management (Armendáriz and Morduch, 2010).

Because it is possible to achieve both profitability and outreach, the policy makers should consider encouraging the recent drive towards attainment of profitability by the MFIs. Cooperatives may benefit from their ability to collect savings but still operate in a local community level and to have a knowledge and trust of its members. Banks on the other hand, seem to have the most structured and efficient operations but they need to be extremely careful not to raise interest rates to too high levels because the effect on portfolio quality is most dramatic to that group. All in all, it seems that bank and cooperatives may be the most efficient way to form a microfinance institution because they are able to achieve both profitability and outreach at the same time.

9.4. Results need to always be interpreted in a right geographical context

In the beginning of the research, I mentioned that regional differences are large in microfinance market. The growth rate, inflations, interest rates, regulatory issues etc. depend on the geographical location which therefore defines a suitable style for MFIs to operate (Ahlin et al. (2011).

Regarding profitability, Asia has significantly lower profitability throughout all the measures compared to LAC. There are much more microfinance institution in Asia that partly effects on the results. It is mostly due to the higher population, but even when measured on per capita basis, South Asia has twice as much microcredit as any other region (Gonzalez and Rosenberg, 2006). The demand relative to supply may not be that large in Asia, where there are relatively more microfinance providers. This could decline the profitability levels for institution in Asia. In regards profitability, results relating to Africa and middle region are not significant.

In regards the portfolio quality, Asia improves its performance to similar levels with LAC region. But on the other hand, the portfolio quality is lower in Africa compared to other regions. When there are a large number of very poor borrowers, the declined portfolio quality is rational finding. Microfinance is extremely important in the areas where the access to the traditional financial system is low. In these areas MFIs reach more clients and are more profitable (Vanroose and Bert 2013). Vanroose and Bert (2013) explain that it is due to the market-failure hypotheses: MFIs respond to a need that banks do not fulfill and MFIs flourish where the formal financial sector fails. For this reason, even though the lower portfolio quality, institutions in Africa are able to achieve good profitability levels in comparison to other regions.

The results also show that trade-off is much larger in middle and in LAC compared to Asia and Africa. Trade-off is therefore more serious problem in the regions that are more developed. This is also aligned with the Vanroose and Bert (2013) finding that the outreach is larger for institutions in the regions where the access to the traditional finance system is low. This is mostly due to the fact that in better developed areas there are less extremely poor people (Armendáriz and Szafarz, 2011). In LAC and middle, it is much more expensive to try to reach poorest of the poor, when there are relatively few people that belong to the group of extremely poor people. Even more, the outreach is significantly weaker in middle region

compared even to LAC. Gonzales and Rosenberg (2006) explain that microfinance got much later start in the middle region which could partly lead to different results in that region.

Overall, the country context appears to be an important determinant of MFI performance (Ahlin et al., 2011). Asia has been the largest development field for microfinance industry but it seems that institutions should put more effort reaching the profitability of the operations. In Africa both profitability and outreach levels are good, but future work should be directed to improve portfolio quality. For middle region and LAC, that are the most developed regions, the focus should be to reach larger poverty outreach levels. Much more investigation is needed on the regional differences, what are the root causes behind those, and what the regions could learn from each other. All in all, macroeconomy and the geographical location cannot be forgotten when considering the performance of the MFIs.

10. Concluding remarks

In my research, I have found that decreasing costs and increasing interest rates are the main drivers for the profitability of the institutions. Even more important finding is that institutions can aim to profitability and at the same time have a high poverty outreach. It is possible to achieve both goals especially for banks and cooperatives. Since there are not big differences in interest rates charged between the institution types, it seems that profit-oriented institutions are able to operate more cost effective way to be able to reach the poorest of the poor efficiently. My finding is relevant for policy makers when deciding on whether or not to subsidize microfinance and whether to set regulations to support commercialization. The finding is relevant for microfinance practitioners for their decisions to further improve the efficiency of their operations and not being afraid of aiming to achieve higher profitability. The finding is also important for commercial investors who aim to be socially responsible investors and who could invest in profitability institutions and achieve both sustainability and profitability.

In the practical point of view, there is a lack of financing in microfinance industry that could best be fulfilled through commercialized institutions. Byström (2008) claims that the total annual demand for microcredit, the most developed sub-discipline of microfinance, is much larger than philanthropy and development aid are capable of providing. He also suggests a commercialization of microlending as a possible solution for the unmet demand. Letting profit-oriented institutions enter a scene that is still dominated to a large extent by donation-

based institutions, one is more likely to raise the huge amounts of funds needed to meet the demand (Byström, 2008). He also recommends that in addition to the increased supply of funds, commercialization would also benefit MFIs and microborrowers by providing loans with longer maturities and more diversified funding sources. Cull et al. (2009) expect that the private sector will be a growing part of microfinance: the gaps in access are large and the private sector has proven to be innovative, fast-growing, and especially ready to adopt new technology. The challenge is to embrace the opportunities of the market while recognizing the potential trade-offs.

Based on my results, it is important to try to make operations of the institutions more efficient and make institutions achieve higher profitability levels. As Gonzales and Rosenberg (2006) state private microfinance is profitable and stable enough to move into the mainstream financial system. Copestake (2007) researches poverty oriented MFIs and suggests that there is a lot of diversity of practice. Some of the MFIs have strong financial and social performance systems, but there is a lot of room for them to do better. Banks and cooperatives have been able to have more efficient operations which may cause the smaller outreach trade-off for those types of institutions. Also other institutions should aim to that direction. Gonzales and Rosenberg (2006) introduce recommended improvement areas including improved goal setting, strategic planning, routine monitoring of the poverty status of clients and ex-clients, a capacity for follow-up research into the reasons behind observed changes, and periodic reviews of these activities. These changes could help to accelerate the pace of innovation and growth in a more poverty and gender aware manner.

Because there is not significant trade-off between the profitability and outreach, policies should be guided in a way that they encourage institution to achieve greater profitability. By doing their operations in a more commercialized and institutionalized way, they could also reach the larger number of people in total. The total spillover effects of microfinance institutions could be much larger and larger development impact could be achieved. As Karlan and Goldberg (2007) explain it would be mistake to restrict the analysis only to groups that are direct microfinance customers. That would misstate the full impact of the program, because the program can be expected to generate impact on millions of non-participants through spillovers.

Nevertheless, it is important to remember that different kinds of institutions are needed and not every institution need to be commercialized. There are still many poor people that are best

served by the small aid or subsidy-based institutions. Nevertheless, this is not the general direction where the majority of the institutions should be developed towards. Byström (2008) describes the challenges in a microfinance industry in a following way: “Similarly as there is complaint that microfinance as a whole is damaging for the poor due to exceptions, byproducts and side effects, similarly it can be said that commercialized microfinance is extremely damaging to the poor”. Nevertheless, overall impact of commercialized microfinance can be one of the most crucial solutions to long term poverty reduction in developing world. The potential of commercial microfinance is huge but so are the hurdles that have to be overcome.

As Cull al. (2011) states: “Commercial financial institutions are apt to play increasingly large roles in serving those with low-incomes, if not the poorest. The expansion represents a potentially large gain given barriers to financial access that span well beyond just the poorest households”, I also conclude my study in a similar way. To enable microfinance to reach its full potential, it is essential to put more effort on commercialization of the microfinance industry still remembering the individuality and heteroscedasticity of the institutions. As proven in this report, it is possible to achieve profitability without sacrificing the outreach to the poorest. This is especially true for more profit-oriented institutions such as banks and cooperatives that have more efficient operations and cost structure. Future research should be focused on how to commercialize institutions in a sustainable way instead of debating whether it is beneficial to do so. With some microlenders transforming from nonprofit to regulated institutions and banks redefining their operations to include lending to the poor, the microfinance industry has become more business-like and more complex (Armendáriz and Morduch, 2010). It is important to research which innovations could enable commercialized banks to reach poorest people more efficiently in the future while still maintaining their profitability levels and sustainable operation models (also Cull et al., 2011). Microfinance presents itself as a new market-based strategy for poverty reduction (Armanderiz and Morduch, 2010) and the most crucial thing to do is to research how to best implement all the potential benefits that the microfinance has to offer.

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12. Appendixes

Appendix 1

Table 14
Results from the portfolio quality regression
This table shows the impact of high interest rates to the portfolio quality (Equation 3). Abbreviations in the table are following: PaR30 – portfolio at risk (30days), LLR – loan loss ratio, Writeoff – write-off ratio, Yield – portfolio yield, Yield^2 – portfolio yield squared, Age – maturity of the institution, Size – size of the gross loan portfolio, ALB – average loan balance, LtA – loans to assets, Pstatus – profit status, TeTA – total expenses to assets, PeTA – personal expenses to assets. Portfolio quality is measured with three different proxies PaR30, Loan loss ratio and writeoff ratio. The regression is run with the random effects method with White's robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	PaR30	LLR	Writeoff
Yield	-0.02	-0.016	-0.017
	(-0.65)	(-1.07)	(-1.09)
NBFI	0.009	0.009	0.011
	(0.66)	(1.38)	(1.37)
NGO	0.068***	0.016***	0.017**
	(2.86)	(2.67)	(2.34)
Coop	0.035	0.01**	0.01*
	(1.43)	(2.05)	(1.87)
*Yield*NBFI*	0.013	0.006	0.005
	(0.31)	(0.17)	(0.12)
*Yield*NGO*	-0.282	0.014	0.021
	(-2.35)	(0.45)	(0.58)
*Yield*Coop*	-0.163	0.001	-0.01
	(-0.99)	(0.02)	(-0.32)
Yield^2	0.017	0.024***	0.038***
	(0.99)	(3.92)	(6.68)
*Yield^2*NBFI*	-0.06	-0.024	-0.042
	(-1.62)	(-0.69)	(-1.06)
*Yield^2*NGO*	0.221	-0.08*	-0.11**
	(1.52)	(-1.74)	(-2.14)
*Yield^2*Coop*	0.142	-0.086	-0.082
	(0.61)	(-1.12)	(-1.06)
Age	0.019***	0.005***	0.007***
	(5.96)	(3.14)	(3.44)
Size	-0.006***	0	-0.001
	(-3.33)	(-0.01)	(-0.53)
ALB	0.012***	0.004**	0.005***
	(3.21)	(2.53)	(2.85)
LtA	-0.067**	-0.061***	-0.07***
	(-2.31)	(-4.31)	(-4.51)
PStatus	0.007	0.005*	0.006**
	(0.96)	(1.75)	(2.05)
TEtA	0.341***	0.175***	0.178***
	(6.41)	(6.91)	(7.39)
PEtA	-0.396***	-0.126***	-0.114***
	(-4.69)	(-3.29)	(-2.94)
Africa	0.007	-0.01***	-0.011***
	(0.80)	(-2.40)	(-2.50)
Asia	0.01	0.004	0.003
	(1.13)	(1.26)	(0.73)
Middle	-0.011***	-0.001	-0.002
	(-1.68)	(-0.44)	(-0.76)
Cons	0.032	-0.015	-0.002
	(0.89)	(-0.59)	(-0.06)
n	3446	3542	3446
R^2	0.092	0.235	0.238
Wald Chi	146.59	187.18	261.5
	21.00	21.00	21.00

Appendix 2

Table 15
Linear combinations for the portfolio quality regression
The table shows the base effect for each of the institution type interaction term without comparing results to the omitted category. Abbreviations in the table are following: PaR30 – portfolio at risk (30days), LLR – loan loss ratio, Writeoff – write-off ratio, Yield – portfolio yield, Yield^2 – portfolio yield squared. The regression is run with the random effects method with White's robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	PaR30	LLR	Writeoff
*Yield*NBFI*	-0.007	-0.009	-0.013
	(-0.23)	(-0.25)	(-0.32)
*Yield*NGO*	-0.302**	0.021	0.035
	(-2.55)	(0.66)	(0.99)
*Yield*Coop*	-0.183	-0.014	-0.019
	(-1.13)	(-0.47)	(-0.63)
*Yield^2*NBFI*	-0.043	-0.004	-0.002
	(-1.29)	(-0.01)	(-0.06)
*Yield^2*NGO*	0.239	-0.086	-0.117**
	(1.64)	(-1.60)	(-2.02)
*Yield^2*Coop*	0.159	-0.054	-0.056
	(0.69)	(-0.68)	(-0.68)

Appendix 3

Table 16

Results from the profitability regression when adding variables one by one.

The table shows results from the Equation 1 and 2 that studies the profitability function of the institution. In this table the variables are added to the regression one by one to be able to study the effect of each individual variable and combined effect of many variables. Abbreviations in the table are following: OSS – operational self-sufficiency, Yield – portfolio yield, Age – maturity of the institution, Size – size of the gross loan portfolio, ALB – average loan balance, LtA – loans to assets, Pstatus – profit status, PaR30 – portfolio at risk (30days), TeTA – total expenses to assets, PeTA – personal expenses to assets, Yield^2 – portfolio yield squared. The regression is run with the random effects method with White's robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
				OSS		
Yield	0.860***	0.855***	0.764***	0.726***	0.918***	0.851***
	(14.07)	(13.97)	(6.00)	(5.59)	(5.44)	(5.01)
Age	0.003	0.002	0.003	0.002	0.005	0.003
	(0.27)	(0.19)	(0.24)	(0.13)	(0.40)	(0.24)
Size	-0.001	0.000	0.003	0.003	0.002	0.002
	(-0.13)	(-0.06)	(0.49)	(0.56)	(0.37)	(0.42)
ALB	-0.005	-0.001	-0.023*	-0.021*	-0.024*	-0.024*
	(-0.53)	(-0.13)	(-1.84)	(-1.69)	(-1.93)	(-1.89)
LtA	0.592***	0.584***	0.590***	0.589***	0.597***	0.599***
	(10.36)	(9.68)	(9.58)	(9.49)	(9.69)	(9.69)
PStatus	0.019	0.003	0.031	0.033	0.023	0.026
	(1.10)	(0.07)	(0.84)	(0.92)	(0.62)	(0.73)
PaR30	-0.359***	-0.359***	-0.350***	-0.351***	-0.351***	-0.353***
	(-4.28)	(-4.29)	(-4.14)	(-4.23)	(-4.12)	(-4.22)
TEtA	-1.983***	-1.984***	-1.991***	-2.730***	-2.008***	-2.711***
	(-11.38)	(-11.37)	(-11.32)	(-8.16)	(-11.21)	(-8.07)
PEtA	0.551***	0.533**	0.474**	2.559***	0.411*	2.414**
	(2.60)	(2.52)	(2.22)	(3.90)	(1.92)	(3.65)
NBFI		0.039	0.034	0.027	0.090	0.083
		(1.04)	(0.66)	(0.35)	(1.52)	(0.95)
NGO		0.022	0.036	0.015	0.062	0.032
		(0.36)	(0.53)	(0.18)	(0.83)	(0.34)
Coop		-0.034	-0.021	0.018	0.082	0.196*
		-0.60	-0.28	(0.19)	(1.10)	(1.89)
Africa			0.011	0.010	0.013	0.010
			(0.35)	(0.31)	(0.42)	(0.32)
Asia			-0.091***	-0.089***	-0.097***	-0.098***
			(-3.78)	(-3.69)	(-3.91)	(-3.92)
Middle			0.030	0.034	0.030	0.035
			(1.07)	(1.23)	(1.11)	(1.28)
*Yield*NBFI*			0.059	0.129	-0.405*	-0.318
			(0.42)	(0.86)	(-1.84)	(-1.49)
*Yield*NGO*			0.084	0.092	-0.222	-0.184
			(0.58)	(0.56)	(-0.76)	(-0.62)
*Yield*Coop*			0.097	0.349	-1.301***	-1.160***
			(0.36)	(0.96)	(-3.28)	(-2.84)
*TEtA*NBFI*				0.743**		0.692*
				(1.96)		(1.80)
*TEtA*NGO*				0.816*		0.792*
				(1.87)		(1.81)
*TEtA*Coop*				0.115		-0.048
				(0.21)		(-0.09)
*PEtA*NBFI*				-2.217***		-2.129***
				(-3.26)		(-3.10)
*PEtA*NGO*				-2.096***		-1.975***
				(-2.88)		(-2.70)
*PEtA*Coop*				-1.687		-2.888***
				(-1.62)		(-3.46)
Yield^2					-0.149	-0.121
					(-1.31)	(-1.04)
*Yield^2*NBFI*					0.572***	0.562***
					(3.29)	(3.03)
*Yield^2*NGO*					0.414	0.359
					(1.19)	(1.04)
*Yield^2*Coop*					2.91***	3.898***
					(4.69)	(4.38)
n	3446	3446	3446	3446	3446	3446
R^2	0.45	0.45	0.46	0.46	0.47	0.47
Wald Chi	413	416	433	590	445	625
	(9.00)	(12.00)	(18.00)	(24.00)	(22.00)	(28.00)

Appendix 4

Table 17

Robustness check for profitability and outreach functions for the year 2010

This table shows all the main regressions with smaller data set including only observations from the year 2010. Abbreviations in the table are following: OSS – operational self-sufficiency, Yield – portfolio yield, Age – maturity of the institution, Size – size of the gross loan portfolio, ALB – average loan balance, LtA – loans to assets, Pstatus – profit status, PaR30 – portfolio at risk (30days), TeTA – total expenses to assets, PeTA – personal expenses to assets, Yield^2 – portfolio yield squared, Female – percentage of female borrowers. This regression is run with the ordinary least squares method. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Profitability 2010	
	OSS
Yield	1.887***
	(5.99)
NBFI	0.016
	(0.22)
NGO	0.063
	(0.78)
Coop	0.032
	(0.34)
*Yield*NBFI*	-0.239
	(-0.75)
*Yield*NGO*	-0.32
	(-0.99)
*Yield*Coop*	-0.524
	(-1.25)
Age	-0.021
	(-1.24)
Size	-0.002
	(-0.33)
ALB	-0.015
	(-1.20)
LtA	0.587***
	(8.89)
PStatus	0.018
	(0.50)
PaR30	-0.039
	(-0.54)
TEtA	-3.069***
	(-18.35)
PEtA	0.882***
	(3.47)
Africa	-0.012
	(-0.29)
Asia	0.041
	(1.26)
Middle	0.052**
	(2.04)
Cons	1.065***
	(6.59)
n	602
R^2	0.526
F	(35.98)
	F(18,583)

Yield squared 2010	
	OSS
Yield	1.349*
	(1.85)
NBFI	-0.091
	(-0.87)
NGO	0.044
	(0.41)
Coop	0.026
	(0.19)
*Yield*NBFI*	0.634
	(0.82)
*Yield*NGO*	-0.013
	(-0.02)
*Yield*Coop*	-0.435
	(-0.40)
Yield^2	1.007
	(0.82)
*Yield^2*NBFI*	-1.361
	(-1.09)
*Yield^2*NGO*	-0.643
	(-0.50)
*Yield^2*Coop*	-0.11
	(-0.06)
Age	-0.021
	(-1.28)
Size	-0.001
	(-0.14)
ALB	-0.015
	(-1.18)
LtA	0.594***
	(8.88)
PStatus	0.023
	(0.62)
PaR30	-0.037
	(-0.51)
TEtA	-3.085***
	(-18.38)
PEtA	0.885***
	(3.44)
Africa	-0.016
	(-0.40)
Asia	0.04
	(1.19)
Middle	0.049*
	(1.94)
Cons	1.094***
	(6.18)
n	602
R^2	0.529
F	(29.59)
	F(22,579)

Outreach 2010		
	ALB	Female
OSS	-0.914**	0.299***
	(-2.16)	(2.64)
NBFI	-1.562***	0.351***
	(-3.09)	(2.62)
NGO	-1.81***	0.556***
	(-3.47)	(4.06)
Coop	-1.924***	0.476***
	(-2.77)	(2.70)
*OSS*NBFI*	0.869**	-0.23*
	(1.94)	(-1.94)
*OSS*NGO*	0.881**	-0.345***
	(1.97)	(-2.92)
*OSS*Coop*	1.91***	-0.429***
	(3.15)	(-2.79)
Age	0.073	-0.024*
	(1.28)	(-1.71)
Size	0.123***	-0.008*
	(5.96)	(-1.67)
LtA	0.008	0.06
	(0.04)	(1.13)
PStatus	0.125	0.002
	(0.98)	(0.07)
PaR30	0.359	-0.081
	(1.37)	(-1.29)
Africa	-1.036***	0.039
	(-8.08)	(1.23)
Asia	-1.61***	0.247***
	(-20.53)	(13.07)
Middle	0.33***	-0.138***
	(3.81)	(-6.47)
Cons	6.216***	0.339**
	(10.90)	(2.32)
n	682	649
R^2	0.602	0.435
F	(67.16)	(32.54)
	F(15,666)	F(15,633)

Appendix 5

Table 18

Area specific profitability regression with yield squared terms for robustness check

This table shows the profitability regressions for each of the geographical areas. Abbreviations in the table are following: OSS – operational self-sufficiency, Yield – portfolio yield, Yield^2 – portfolio yield squared, Age – maturity of the institution, Size – size of the gross loan portfolio, ALB – average loan balance, LtA – loans to assets, Pstatus – profit status, PaR30 – portfolio at risk (30days), TeTA – total expenses to assets, PeTA – personal expenses to assets. This regression is run with the random effects regression with the White's robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	LAC	Africa	Asia	Middle
		OSS		
Yield	0.539	0.561*	1.947	0.238
	(1.40)	(1.64)	(1.52)	(0.97)
NBFI	0.109	-0.196	0.206	-0.099
	(0.64)	(-1.15)	(1.53)	(-1.22)
NGO	0.089	-0.15	0.308*	-0.192
	(0.82)	(-0.65)	(1.89)	(-1.28)
Coop	-0.08	-0.16	0.3*	-0.025
	(-0.89)	(-0.80)	(1.81)	(-0.15)
*Yield*NBFI*	-0.149	0.023	-1.103	0.433
	(-0.23)	(0.05)	(-0.82)	(1.27)
*Yield*NGO*	-0.557	0.076	-1.189	0.758
	(-1.04)	(0.11)	(-0.90)	(0.82)
*Yield*Coop*	-0.631	0.027	-1.845	-0.642
	(-1.10)	(0.03)	(-1.33)	(-1.14)
Yield^2	0.998	-0.082	-4.119	1.906***
	(1.63)	(-0.59)	(-1.19)	(3.74)
*Yield^2*NBFI*	-0.649	0.311	3.611	-1.119*
	(-0.91)	(1.35)	(1.02)	(-1.82)
*Yield^2*NGO*	0.014	0.077	4.389	-1.787
	(0.02)	(0.13)	(1.26)	(-1.03)
*Yield^2*Coop*	1.987	0.097	6.107*	1.885*
	(1.32)	(0.05)	(1.73)	(1.65)
Age	-0.031	0.047**	0.028*	0.023
	(-1.33)	(2.01)	(1.70)	(1.09)
Size	-0.018**	0.008	0.016**	-0.014
	(-2.18)	(0.37)	(1.99)	(-0.78)
ALB	-0.004	-0.025	-0.008	-0.073***
	(-0.17)	(-0.93)	(-0.50)	(-2.92)
LtA	0.513***	0.898***	0.458***	0.91***
	(5.57)	(5.80)	(6.20)	(7.14)
Pstatus	-0.013	0.056	0.14**	-0.005
	(-0.21)	(0.68)	(2.01)	(-0.09)
PaR30	-0.401***	0.005	-0.347***	-0.486**
	(-2.72)	(0.02)	(-4.09)	(-2.54)
TEtA	-1.741***	-1.119***	-2.052***	-3.445***
	(-11.63)	(-5.57)	(-8.28)	(-10.52)
PEtA	0.308*	-0.3	0.299	0.916*
	(1.88)	(-0.99)	(0.78)	(1.87)
Cons	1.433***	0.701*	0.493***	1.819***
	(8.78)	(1.81)	(2.58)	(4.02)
n	1393	275	895	883
R^2	0.374	0.575	0.626	0.554
Chi squared	447.73	270.29	314.87	273.06
	(19.0)	(19.0)	(19.0)	(19.0)

Appendix 6

Table 19

Area specific profitability regression with yield squared terms for robustness check

This table shows the outreach regressions for each of the geographical areas. Abbreviations in the table are following: ALB – average loan balance, OSS – operational self-sufficiency, Age – maturity of the institution, Size – size of the gross loan portfolio, LtA – loans to assets, Pstatus – profit status, PaR30 – portfolio at risk (30days). This regression is run with the random effects regression with the White's robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	LAC	Africa	Asia	Middle
		ALB		
OSS	-0.338	-0.941***	0.239	-0.423*
	(-1.04)	(-2.74)	(0.96)	(-1.91)
NBFI	-0.172	-1.317**	0.318	-0.785**
	(-0.42)	(-2.09)	(0.84)	(-2.40)
NGO	-0.126	-1.575**	-0.081	-0.819**
	(-0.32)	(-1.97)	(-0.21)	(-2.41)
Coop	1.005**	0.118	-0.267	0.92**
	(2.23)	(0.14)	(-0.38)	(2.34)
*OSS*NBFI*	0.372	1.101***	-0.453	0.645***
	(1.11)	(2.77)	(-1.52)	(2.73)
*OSS*NGO*	0.469	0.673*	-0.31	0.389*
	(1.42)	(1.85)	(-1.23)	(1.77)
*OSS*Coop*	0.127	0.292	0.502	0.368
	(0.34)	(0.76)	(0.81)	(1.61)
Age	-0.017	0.09	0.035	0.022
	(-0.38)	(1.53)	(0.74)	(0.46)
Size	0.368***	0.308***	0.233***	0.3***
	(13.24)	(6.74)	(9.10)	(9.19)
LtA	-0.233	0.168	-0.079	0.378*
	(-1.38)	(0.71)	(-0.47)	(1.92)
Pstatus	-0.051	0.272	-0.006	0.705***
	(-0.39)	(0.51)	(-0.03)	(3.55)
PaR30	0.259	0.194	-0.184	0.417
	(1.08)	(1.06)	(-1.03)	(1.38)
Cons	1.075**	1.887*	1.423***	2.278***
	(2.39)	(1.89)	(2.76)	(4.15)
n	2009	467	1319	1256
R^2	0.303	0.478	0.449	0.431
Chi squared	589.8	271.99	152.34	395.6
	(12.0)	(12.0)	(12.0)	(12.0)

Appendix 7

Table 20: List of the areas, countries and institutions

Area	Country	MFI name
Africa	Benin	ALIDA©
Africa	Benin	Maritime
Africa	Cameroon	Advans Cameroun
Africa	Cameroon	CCA
Africa	Cameroon	CDS
Africa	Cameroon	CFA Microfinance
Africa	Cameroon	MUFFA
Africa	Congo, Democrati	FINCA - DRC
Africa	Congo, Democrati	ProCredit Bank- DRC
Africa	Congo	FAM
Africa	Cote d'Ivoire	CEP-CECREV
Africa	Ethiopia	PEACE
Africa	Gambia	Reliance
Africa	Ghana	CEDEF
Africa	Ghana	Dwetire
Africa	Ghana	G-Life
Africa	Ghana	Grameen Ghana
Africa	Ghana	ID Ghana
Africa	Ghana	OISL
Africa	Ghana	ProCredit - GHA
Africa	Ghana	Sinapi Aba Trust
Africa	Ghana	Y-SEF
Africa	Kenya	BIMAS
Africa	Kenya	ECLOF - KEN
Africa	Kenya	Equity Bank
Africa	Kenya	Faulu - KEN
Africa	Kenya	Juhudi Kilimo
Africa	Kenya	KADET
Africa	Kenya	KPOSB
Africa	Kenya	K-Rep
Africa	Kenya	KWFT
Africa	Kenya	Micro Kenya
Africa	Kenya	SMEP
Africa	Liberia	BRAC - LBR
Africa	Madagascar	CECAM
Africa	Madagascar	SIPEM
Africa	Malawi	CUMO
Africa	Malawi	FINCA - MWI
Africa	Malawi	MLF MWI
Africa	Mali	Miselini
Africa	Mali	PASECA - Kayes
Africa	Mozambique	CCOM
Africa	Mozambique	FDM
Africa	Mozambique	Hluvuku
Africa	Mozambique	NovoBanco - MOZ
Africa	Niger	MECREF
Africa	Nigeria	SEAP
Africa	Rwanda	ACB sa
Africa	Rwanda	Duterimbere
Africa	Rwanda	RML
Africa	Rwanda	UOB
Africa	Senegal	ACEP Senegal
Africa	Senegal	CAURIE Micro Finance
Africa	Senegal	MicroCred - SEN
Africa	Senegal	U-IMCEC
Africa	Sierra Leone	BRAC - SLE
Africa	South Africa	Capitec Bank
Africa	South Africa	Ekukhanyeni
Africa	South Africa	SEF-ZAF
Africa	Tanzania	FINCA - TZA
Africa	Tanzania	IDYDC
Africa	Tanzania	SEDA
Africa	Togo	ASDEB
Africa	Togo	CAPAB
Africa	Togo	CECA
Africa	Togo	FECECAV
Africa	Togo	FUCEC Togo
Africa	Togo	MGPCC DEKAWOWO
Africa	Uganda	BRAC - UGA
Africa	Uganda	Centenary Bank
Africa	Uganda	Finance Trust
Africa	Uganda	ISSIA
Africa	Uganda	KSCS
Africa	Uganda	Madfa SACCO
Africa	Uganda	MED-Net
Africa	Uganda	MUL
Africa	Uganda	Opportunity Uganda
Africa	Zambia	CETZAM
Africa	Zambia	FINCA - ZMB
Africa	Zambia	MBT
Africa	Zambia	MCF Zambia

Area	Country	MFI name
Asia	Afghanistan	ASA-AFG
Asia	Afghanistan	BRAC - AFG
Asia	Afghanistan	FMFB - AFG
Asia	Afghanistan	Hope for Life
Asia	Afghanistan	OXUS - AFG
Asia	Afghanistan	Parwaz
Asia	Bangladesh	AF
Asia	Bangladesh	ASA
Asia	Bangladesh	BASTOB
Asia	Bangladesh	BEES
Asia	Bangladesh	BRAC
Asia	Bangladesh	BURO Bangladesh
Asia	Bangladesh	CCDA
Asia	Bangladesh	CDIP
Asia	Bangladesh	CSS
Asia	Bangladesh	CTS
Asia	Bangladesh	DSK
Asia	Bangladesh	ESDO
Asia	Bangladesh	Ghashful
Asia	Bangladesh	Grameen Bank
Asia	Bangladesh	GUK
Asia	Bangladesh	HEED
Asia	Bangladesh	IDF
Asia	Bangladesh	JCF
Asia	Bangladesh	Muslim Aid
Asia	Bangladesh	NGF
Asia	Bangladesh	POPI
Asia	Bangladesh	RDRS
Asia	Bangladesh	RIC
Asia	Bangladesh	RRF
Asia	Bangladesh	Sajida
Asia	Bangladesh	SDC
Asia	Bangladesh	Shakti
Asia	Bangladesh	SKS Bangladesh
Asia	Bangladesh	SSS
Asia	Bangladesh	ST
Asia	Bangladesh	TMSS
Asia	Bangladesh	Wave
Asia	Bhutan	BDBL
Asia	Cambodia	ACLEDA
Asia	Cambodia	AMK
Asia	Cambodia	AMRET
Asia	Cambodia	CBIRD
Asia	Cambodia	CCSF
Asia	Cambodia	Chamroeun
Asia	Cambodia	Farmer Finance Ltd
Asia	Cambodia	HKL
Asia	Cambodia	IPR
Asia	Cambodia	KREDIT
Asia	Cambodia	Maxima
Asia	Cambodia	PRASAC
Asia	Cambodia	SAMIC-Limited
Asia	Cambodia	Sathapana Limited
Asia	Cambodia	Seilanithih
Asia	Cambodia	TPC
Asia	Cambodia	VFC
Asia	China	CFPA
Asia	China	CZWSDA
Asia	East Timor	Moris Rasik
Asia	East Timor	TRM
Asia	India	Adhikar
Asia	India	Ajiwika
Asia	India	AML
Asia	India	AMMACTS
Asia	India	AMPL
Asia	India	Arohan
Asia	India	ASA India
Asia	India	Asirvad
Asia	India	Asomi
Asia	India	Bandhan
Asia	India	BASIX
Asia	India	BIRDS
Asia	India	BISWA
Asia	India	BJS
Asia	India	BSS
Asia	India	BWDA Finance
Asia	India	BWDC
Asia	India	Cashpor MC
Asia	India	CCFID
Asia	India	CDOT
Asia	India	Chaitanya

Area	Country	MFI name
Asia	India	Disha
Asia	India	Disha Microfin
Asia	India	Equitas
Asia	India	ESAF
Asia	India	FFSL
Asia	India	GFSPL
Asia	India	GLOW
Asia	India	GOF
Asia	India	Grama Vidiyal Microfinance Ltd.
Asia	India	GU
Asia	India	GUARDIAN
Asia	India	HiH
Asia	India	Hope Microcredit
Asia	India	ICNW
Asia	India	IDF Financial Services
Asia	India	India's Capital Trust Ltd
Asia	India	Indur MACS
Asia	India	Janalakshmi Financial Services Pvt. Ltd.
Asia	India	KCIPL
Asia	India	Kotalipara
Asia	India	Mahasemam
Asia	India	Mahashakti
Asia	India	Mimo Finance
Asia	India	MMFL
Asia	India	Muthoot
Asia	India	Nano
Asia	India	NBJK
Asia	India	NCS
Asia	India	NEED
Asia	India	Pustikar
Asia	India	PWMACS
Asia	India	RASS
Asia	India	RGVN
Asia	India	RISE
Asia	India	RORES
Asia	India	Sahara Utsarga
Asia	India	Sahayata
Asia	India	Samasta
Asia	India	Sanchetna
Asia	India	Sanghamithra
Asia	India	Sarala
Asia	India	Sarvodaya Nano Finance
Asia	India	SCNL
Asia	India	SEIL
Asia	India	SEWA Bank
Asia	India	SHARE
Asia	India	SKDRDP
Asia	India	SKS
Asia	India	SMILE
Asia	India	SMSS
Asia	India	Sonata
Asia	India	Spandana
Asia	India	SU
Asia	India	Suryoday
Asia	India	Swadhaar
Asia	India	SWAWS
Asia	India	Swayamshree Micro Credit Services
Asia	India	SVCL
Asia	India	SVSDF
Asia	India	TCT
Asia	India	Trident Microfinance
Asia	India	UFSPL
Asia	India	Ujjivan
Asia	India	VFPL
Asia	India	VFS
Asia	India	WSE
Asia	Indonesia	BMT Sanama
Asia	Indonesia	CU Sawiran
Asia	Indonesia	KOMIDA
Asia	Indonesia	MBK Ventura
Asia	Indonesia	WKP
Asia	Laos	ACLEDA Lao
Asia	Malaysia	AIM
Asia	Nepal	CCODER
Asia	Nepal	CSD
Asia	Nepal	DD Bank
Asia	Nepal	DEPROSC-Nepal
Asia	Nepal	FORWARD
Asia	Nepal	JBS
Asia	Nepal	JSCCS
Asia	Nepal	Mahuli

Area	Country	MFI name
Asia	Nepal	Manushi
Asia	Nepal	MBBL
Asia	Nepal	NeRuDO
Asia	Nepal	NESDO
Asia	Nepal	Nirdhan
Asia	Nepal	NRDSC
Asia	Nepal	Sahara Mahila
Asia	Nepal	SOLVE
Asia	Nepal	UNYC
Asia	Pakistan	Apna Microfinance Bank (Former
Asia	Pakistan	ASA Pakistan
Asia	Pakistan	BRAC - PAK
Asia	Pakistan	CSC
Asia	Pakistan	CWCD
Asia	Pakistan	DAMEN
Asia	Pakistan	FMFB - Pakistan
Asia	Pakistan	JWS
Asia	Pakistan	Kashf Bank
Asia	Pakistan	Khushhali Bank
Asia	Pakistan	NRSP
Asia	Pakistan	NRSP Bank
Asia	Pakistan	POMFB
Asia	Pakistan	RCDS
Asia	Pakistan	Rozgar
Asia	Pakistan	SRSP
Asia	Pakistan	Sungi
Asia	Pakistan	TMFB
Asia	Pakistan	TRDP
Asia	Papua New Guinea	PNG Microfinance Ltd
Asia	Philippines	ASA Philippines
Asia	Philippines	ASKI
Asia	Philippines	CARD NGO
Asia	Philippines	CCT
Asia	Philippines	CEVI
Asia	Philippines	CMEDFI
Asia	Philippines	ECLOF - PHL
Asia	Philippines	FCBFI
Asia	Philippines	Joyful Development, Inc.
Asia	Philippines	JVOFI
Asia	Philippines	Kasagana-Ka
Asia	Philippines	Kazama Grameen
Asia	Philippines	KCCDFI
Asia	Philippines	KMBI
Asia	Philippines	MILAMDEC
Asia	Philippines	MMPC
Asia	Philippines	NWTF
Asia	Philippines	Pagasa
Asia	Philippines	PALFSI
Asia	Philippines	PMPC
Asia	Philippines	Serviamus
Asia	Samoa	SPBD Samoa
Asia	Sri Lanka	Agro Micro
Asia	Sri Lanka	Arthacharya
Asia	Sri Lanka	BDCB
Asia	Sri Lanka	Berendina Microfinance
Asia	Sri Lanka	BRAC - LKA
Asia	Sri Lanka	Lak Jaya
Asia	Sri Lanka	Regional Development Bank
Asia	Sri Lanka	Ruhuna
Asia	Sri Lanka	Sareeram
Asia	Sri Lanka	SDBL
Asia	Sri Lanka	SEEDS
Asia	Sri Lanka	SEWA Finance
Asia	Sri Lanka	WDFH
Asia	Sri Lanka	VFL
Asia	Thailand	SED
Asia	Tonga	SPBD Tonga
Asia	Vietnam	Binhminh CDC
Asia	Vietnam	CEP
Asia	Vietnam	Dariu
Asia	Vietnam	M7 Can Loc
Asia	Vietnam	M7 DB District
Asia	Vietnam	M7 DBP City
Asia	Vietnam	M7 Dong Trieu
Asia	Vietnam	M7 Mai Son
Asia	Vietnam	M7 Ninh Phuoc
Asia	Vietnam	M7 Uong bi
Asia	Vietnam	TCVM Thanh Hoa
Asia	Vietnam	VBSP

Area	Country	MFI name
LAC	Argentina	Avanzar
LAC	Argentina	Contigo Microfinanzas
LAC	Argentina	Cordial Microfinanzas
LAC	Argentina	FIE Gran Poder
LAC	Argentina	OMLA
LAC	Argentina	Pro Mujer - ARG
LAC	Argentina	Progresar
LAC	Belize	LICU
LAC	Bolivia	AgroCapital
LAC	Bolivia	ANED
LAC	Bolivia	Banco FIE
LAC	Bolivia	BancoSol
LAC	Bolivia	CIDRE
LAC	Bolivia	Coop FA¡tima
LAC	Bolivia	Coop JesAºs Nazareno
LAC	Bolivia	CRECER
LAC	Bolivia	Diaconia
LAC	Bolivia	EcoFuturo FFP
LAC	Bolivia	Emprender
LAC	Bolivia	FADES
LAC	Bolivia	Fassil FFP
LAC	Bolivia	FONCRESOL
LAC	Bolivia	FUBODE
LAC	Bolivia	FUNBODEM
LAC	Bolivia	IDEPRO
LAC	Bolivia	IMPRO
LAC	Bolivia	Pro Mujer - BOL
LAC	Bolivia	ProCredit - BOL
LAC	Bolivia	Sartawi
LAC	Brazil	ASCOOB CENTRAL
LAC	Brazil	Banco da FamA-lia
LAC	Brazil	Banco do Empreendedor
LAC	Brazil	Banco do Vale
LAC	Brazil	BANCRI
LAC	Brazil	CEADe
LAC	Brazil	CEAPE MA
LAC	Brazil	CEAPE PE
LAC	Brazil	CEAPE PI
LAC	Brazil	Central Cresol Baser
LAC	Brazil	CrA©dito SolidA¡rio
LAC	Brazil	CrediAmigo
LAC	Brazil	CREDIOESTE
LAC	Brazil	Credisol
LAC	Brazil	Cresol Central
LAC	Brazil	ICC BluSol
LAC	Brazil	SA£o Paulo Confia
LAC	Brazil	Santander MicrocrA©dito
LAC	Chile	BancoEstado
LAC	Chile	Fondo Esperanza
LAC	Colombia	Actuar Quindio
LAC	Colombia	Actuar Tolima
LAC	Colombia	BancamA-a
LAC	Colombia	Banco WWB
LAC	Colombia	BCSC
LAC	Colombia	Comultrasan
LAC	Colombia	Confiar
LAC	Colombia	Contactar
LAC	Colombia	Coomultagro
LAC	Colombia	Coop MEDA
LAC	Colombia	COOTREGUA
LAC	Colombia	Crezcamos
LAC	Colombia	FinAmA©rica
LAC	Colombia	FMM Bucaramanga
LAC	Colombia	FMM PopayA¡n
LAC	Colombia	FMSD
LAC	Colombia	FundaciA³n Amanecer
LAC	Colombia	FUNDESAN
LAC	Colombia	Interactuar
LAC	Colombia	Microempresas de Antioquia
LAC	Costa Rica	ACORDE
LAC	Costa Rica	ACRG
LAC	Costa Rica	ADRI
LAC	Costa Rica	APACOOP
LAC	Costa Rica	APIAGOL
LAC	Costa Rica	ASOPROSANRAMON
LAC	Costa Rica	CREDIMUJER
LAC	Costa Rica	EDESA
LAC	Costa Rica	FIDERPAC
LAC	Costa Rica	FUDECOSUR
LAC	Costa Rica	FundaciA³n Mujer
LAC	Costa Rica	FUNDEBASE
LAC	Costa Rica	FUNDECOCA

Area	Country	MFI name
LAC	Dominican Republi	ALNAP
LAC	Dominican Republi	ASPIRE
LAC	Dominican Republi	Banco ADEMI
LAC	Dominican Republi	Banco ADOPEM
LAC	Dominican Republi	CDD
LAC	Dominican Republi	ECLOF - DOM
LAC	Dominican Republi	FDD
LAC	Dominican Republi	FIME
LAC	Dominican Republi	FONDESA
LAC	Dominican Republi	FundaciA³n Esperanza
LAC	Dominican Republi	PYME BHD
LAC	Ecuador	Banco Solidario
LAC	Ecuador	CACMU
LAC	Ecuador	CEPESIU
LAC	Ecuador	COAC 4 de Octubre
LAC	Ecuador	COAC Ambato
LAC	Ecuador	COAC Artesanos
LAC	Ecuador	COAC Atuntaqui
LAC	Ecuador	COAC Chone
LAC	Ecuador	COAC Fernando Daquilema
LAC	Ecuador	COAC Fondvida
LAC	Ecuador	COAC JardA-n Azuayo
LAC	Ecuador	COAC Kullki Wasi
LAC	Ecuador	COAC La BenA©fica
LAC	Ecuador	COAC Luz del Valle
LAC	Ecuador	COAC MCCH
LAC	Ecuador	COAC Mushuc Runa
LAC	Ecuador	COAC Nacional
LAC	Ecuador	COAC Padre Vicente
LAC	Ecuador	COAC Pallatanga
LAC	Ecuador	COAC Sac Aiet
LAC	Ecuador	COAC San Antonio
LAC	Ecuador	COAC San Gabriel
LAC	Ecuador	COAC San JosA©
LAC	Ecuador	COAC Santa Anita
LAC	Ecuador	CODESARROLLO
LAC	Ecuador	COOPROGRESO
LAC	Ecuador	Credi FA©
LAC	Ecuador	D-Miro
LAC	Ecuador	ECLOF - ECU
LAC	Ecuador	FACES
LAC	Ecuador	FINCA - ECU
LAC	Ecuador	FODEMI
LAC	Ecuador	FundaciA³n Alternativa
LAC	Ecuador	FundaciA³n Espoir
LAC	Ecuador	FUNDAMIC
LAC	Ecuador	INSOTEC
LAC	Ecuador	ProCredit - ECU
LAC	Ecuador	UCADE Ambato
LAC	Ecuador	UCADE Latacunga
LAC	Ecuador	UCADE Santo Domingo
LAC	El Salvador	ACCOVI
LAC	El Salvador	AMC de R.L.
LAC	El Salvador	Apoyo Integral
LAC	El Salvador	ASEI
LAC	El Salvador	AsociaciA³n El Balsamo
LAC	El Salvador	BANCOFIT
LAC	El Salvador	CCAMETRO
LAC	El Salvador	ENLACE
LAC	El Salvador	FADEMYPE
LAC	El Salvador	FINCA - SLV
LAC	El Salvador	FundaciA³n CAMPO
LAC	El Salvador	FUNSALDE
LAC	El Salvador	MICREDITO
LAC	El Salvador	PADECOMSMCREDITO
LAC	Guatemala	ADICLA
LAC	Guatemala	AGUDESA
LAC	Guatemala	ASDIR
LAC	Guatemala	AsociaciA³n SHARE
LAC	Guatemala	AYNLA
LAC	Guatemala	CDRO
LAC	Guatemala	CRYSOL
LAC	Guatemala	FAFIDESS
LAC	Guatemala	FAPE
LAC	Guatemala	FIACG
LAC	Guatemala	FONDESOL
LAC	Guatemala	FundaciA³n MICROS
LAC	Guatemala	FUNDEA
LAC	Guatemala	FUNDEMIX
LAC	Guatemala	FUNDESPE
LAC	Guatemala	GA©nesis Empresarial
LAC	Guatemala	MUDE

Area	Country	MFI name
LAC	Haiti	ACME
LAC	Haiti	FINCA - HTI
LAC	Haiti	Fonkoze Financial Services (SFF)
LAC	Haiti	SOGESOL
LAC	Honduras	ADICH
LAC	Honduras	Banco Popular
LAC	Honduras	Credisol Honduras
LAC	Honduras	FAMA OPDF
LAC	Honduras	FHA
LAC	Honduras	FINCA - HND
LAC	Honduras	FINSOL
LAC	Honduras	FundaciÃ³n Adelante
LAC	Honduras	FUNDAHMICRO
LAC	Honduras	FUNDEVI
LAC	Honduras	FUNED
LAC	Honduras	HDH OPDF
LAC	Honduras	Microfinanciera Prisma
LAC	Honduras	ODEF Financiera
LAC	Honduras	PILARH OPDF
LAC	Honduras	World Relief - HND
LAC	Jamaica	ACCESS
LAC	Mexico	ALSOL
LAC	Mexico	Apoyo EconÃ³mico
LAC	Mexico	APROS
LAC	Mexico	ASP Financiera
LAC	Mexico	Avance
LAC	Mexico	Caja Depac Poblana
LAC	Mexico	CAME
LAC	Mexico	COCDEP
LAC	Mexico	Compartamos Banco
LAC	Mexico	Conserva
LAC	Mexico	CrediClub
LAC	Mexico	CrediComAºn
LAC	Mexico	CREDITUYO
LAC	Mexico	Don Apoyo
LAC	Mexico	Finacen
LAC	Mexico	FinAmigo
LAC	Mexico	Financiera Independencia
LAC	Mexico	FINCA - MEX
LAC	Mexico	FinComAºn
LAC	Mexico	FinLabor
LAC	Mexico	Forjadores de Negocios
LAC	Mexico	GCM
LAC	Mexico	Invirtiendo
LAC	Mexico	Mas Kapital
LAC	Mexico	Oportunidad Microfinanzas
LAC	Mexico	Pretmex
LAC	Mexico	Pro Mujer - MEX
LAC	Mexico	ProApoyo
LAC	Mexico	Progresemos
LAC	Mexico	SemiSol
LAC	Mexico	Sociedad Enlace
LAC	Mexico	SOLFI
LAC	Mexico	SoluciÃ³n Asea
LAC	Mexico	SUFIRMA
LAC	Mexico	Te Creemos
LAC	Mexico	Vision Fund - MEX
LAC	Nicaragua	ACODEP
LAC	Nicaragua	ADIM
LAC	Nicaragua	AFODENIC
LAC	Nicaragua	ASODERI
LAC	Nicaragua	BANEX
LAC	Nicaragua	CEPRODEL
LAC	Nicaragua	FDL
LAC	Nicaragua	FINANCIA CAPITAL
LAC	Nicaragua	Financiera Fama
LAC	Nicaragua	FINCA - NIC
LAC	Nicaragua	FODEM
LAC	Nicaragua	FUDEMI
LAC	Nicaragua	FundaciÃ³n 4i-2000
LAC	Nicaragua	FundaciÃ³n LeÃ³n 2000
LAC	Nicaragua	FUNDEPYME
LAC	Nicaragua	FUNDESER
LAC	Nicaragua	PRESTANIC
LAC	Nicaragua	Pro Mujer - NIC
LAC	Nicaragua	ProCredit - NIC
LAC	Nicaragua	PRODESA
LAC	Panama	Coop Juan XXIII
LAC	Panama	Financia Credit
LAC	Panama	Microserfin
LAC	Panama	ProCaja
LAC	Paraguay	Banco Familiar

Area	Country	MFI name
LAC	Paraguay	FIELCO
LAC	Paraguay	FundaciÃ³n Paraguaya
LAC	Paraguay	Interfisa Financiera
LAC	Paraguay	Microsol
LAC	Paraguay	VisiÃ³n Banco
LAC	Peru	ADRA - PER
LAC	Peru	Alternativa Microfinanzas
LAC	Peru	AMA
LAC	Peru	CMAC Arequipa
LAC	Peru	CMAC Cusco
LAC	Peru	CMAC Del Santa
LAC	Peru	CMAC Huancayo
LAC	Peru	CMAC Ica
LAC	Peru	CMAC Maynas
LAC	Peru	CMAC Sullana
LAC	Peru	CMAC Trujillo
LAC	Peru	COOPAC Norandino
LAC	Peru	COOPAC Santo Cristo
LAC	Peru	CRAC Los Andes
LAC	Peru	CRAC Nuestra Gente
LAC	Peru	CRAC SeÃ±or de Luren
LAC	Peru	Crediscotia
LAC	Peru	EDPYME Alternativa
LAC	Peru	EDPYME CredivisiÃ³n
LAC	Peru	EDPYME Nueva VisiÃ³n
LAC	Peru	EDPYME Proempresa
LAC	Peru	EDPYME RaÃ-z
LAC	Peru	EDPYME Solidaridad
LAC	Peru	Financiera Confianza
LAC	Peru	Financiera Crear
LAC	Peru	Financiera Edyficar
LAC	Peru	Financiera Efectiva
LAC	Peru	FINCA - PER
LAC	Peru	FONDESURCO
LAC	Peru	FOVIDA
LAC	Peru	IDER CV
LAC	Peru	Manuela Ramos
LAC	Peru	MiBanco
LAC	Peru	MIDE
LAC	Peru	Popular SAFI
LAC	Peru	PRISMA
LAC	Peru	Pro Mujer - PER
LAC	Suriname	De Schakel
LAC	Uruguay	Microfin Uruguay
LAC	Venezuela	BanGente

Area	Country	MFI name
Middle	Albania	ASC Union
Middle	Albania	BESA
Middle	Albania	NOA - ALB
Middle	Albania	ProCredit Bank - ALB
Middle	Albania	VisionFund Albania
Middle	Armenia	ACBA
Middle	Armenia	AREGAK UCO
Middle	Armenia	ECLOF - ARM
Middle	Armenia	Farm Credit Armenia
Middle	Armenia	FINCA - ARM
Middle	Armenia	INECO
Middle	Armenia	KAMURJ
Middle	Armenia	Nor Horizon
Middle	Armenia	ProCredit Bank - ARM
Middle	Armenia	SEF-ARM
Middle	Azerbaijan	AccessBank
Middle	Azerbaijan	Aqrarkredit
Middle	Azerbaijan	Aqroinvest
Middle	Azerbaijan	Avrasiya-Kredit
Middle	Azerbaijan	Azercredit
Middle	Azerbaijan	Azeri Star
Middle	Azerbaijan	Caspian Invest
Middle	Azerbaijan	DemirBank
Middle	Azerbaijan	Finance Technology
Middle	Azerbaijan	FINCA - AZE
Middle	Azerbaijan	FinDev
Middle	Azerbaijan	KredAqro NBCO
Middle	Azerbaijan	Mol Bulak Azerbaijan
Middle	Azerbaijan	Omni Finance
Middle	Azerbaijan	Parabank
Middle	Azerbaijan	PASHA Kredit
Middle	Azerbaijan	TuranBank
Middle	Azerbaijan	Viator
Middle	Bosnia and Herz.	ADRIA mikro
Middle	Bosnia and Herz.	EKI
Middle	Bosnia and Herz.	LIDER
Middle	Bosnia and Herz.	LOK Microcredit Foundation
Middle	Bosnia and Herz.	MI-BOSPO
Middle	Bosnia and Herz.	MIKRA
Middle	Bosnia and Herz.	Mikro ALDI
Middle	Bosnia and Herz.	MIKROFIN
Middle	Bosnia and Herz.	Partner
Middle	Bosnia and Herz.	PRIZMA
Middle	Bosnia and Herz.	ProCredit Bank - BIH
Middle	Bosnia and Herz.	SINERGIJA
Middle	Bosnia and Herz.	Sunrise
Middle	Bosnia and Herz.	Women for Women
Middle	Bulgaria	Agroimpuls
Middle	Bulgaria	Doveriye- Bulgaria
Middle	Bulgaria	General Toshevo
Middle	Bulgaria	Kredo
Middle	Bulgaria	Mikrofond
Middle	Bulgaria	Nachala
Middle	Bulgaria	ProCredit Bank - BGR
Middle	Bulgaria	USTOI
Middle	Croatia	DEMOS SLC
Middle	Croatia	NOA
Middle	Egypt	ABA
Middle	Egypt	Al Tadamun
Middle	Egypt	CEOSS
Middle	Egypt	DBACD
Middle	Egypt	ESED
Middle	Egypt	FMF
Middle	Egypt	Lead Foundation
Middle	Egypt	SBACD
Middle	Georgia	AgroCredit
Middle	Georgia	CREDO
Middle	Georgia	Crystal
Middle	Georgia	FinAgro
Middle	Georgia	FINCA - GEO
Middle	Georgia	ImerCredit
Middle	Georgia	JSC Bank Constanta
Middle	Georgia	Lazika Capital
Middle	Georgia	ProCredit Bank - GEO
Middle	Iraq	Al-Bashaer Microfinance
Middle	Iraq	CHF Iraq
Middle	Iraq	Relief International Iraq
Middle	Jordan	Alwatani
Middle	Jordan	AMC
Middle	Jordan	MEMCC
Middle	Jordan	MFW
Middle	Jordan	Tamweelcom
Middle	Kazakhstan	ACF
Middle	Kazakhstan	Arnur Credit
Middle	Kazakhstan	Bereke
Middle	Kazakhstan	FFSA
Middle	Kazakhstan	KMF
Middle	Kazakhstan	Moldir
Middle	Kazakhstan	ORDA Credit
Middle	Kazakhstan	Sator
Middle	Kosovo	AFK
Middle	Kosovo	BZMF
Middle	Kosovo	FINCA - KOS
Middle	Kosovo	KGMAMF
Middle	Kosovo	KosInvest
Middle	Kosovo	ProCredit Bank - KOS
Middle	Kyrgyzstan	Agrocredit Plus
Middle	Kyrgyzstan	Ayil Bank
Middle	Kyrgyzstan	Bai Tushum
Middle	Kyrgyzstan	BTA Bank
Middle	Kyrgyzstan	CU Manzini
Middle	Kyrgyzstan	CU Zakowat
Middle	Kyrgyzstan	Elet-Capital
Middle	Kyrgyzstan	First MicroCredit Company
Middle	Kyrgyzstan	FMCC
Middle	Kyrgyzstan	Kompanion
Middle	Kyrgyzstan	Mol Bulak Finance
Middle	Kyrgyzstan	OXUS - KGS
Middle	Kyrgyzstan	Salym Finance
Middle	Lebanon	ADR
Middle	Lebanon	Al Majmoua
Middle	Lebanon	Ameen
Middle	Macedonia	FULM
Middle	Macedonia	Horizonti
Middle	Macedonia	Moznosti
Middle	Macedonia	ProCredit Bank - MKD
Middle	Moldova	Microinvest
Middle	Moldova	ProCredit Bank - MDA
Middle	Moldova	RFC
Middle	Mongolia	Credit Mongol
Middle	Mongolia	Khan Bank
Middle	Mongolia	Netcapital
Middle	Mongolia	TFS
Middle	Mongolia	VFM
Middle	Mongolia	XacBank
Middle	Montenegro	Agroinvest - Montenegro
Middle	Montenegro	Erste Bank
Middle	Morocco	Al Karama
Middle	Morocco	AMSSF/MC
Middle	Morocco	FBPMC
Middle	Morocco	FONDEP
Middle	Palestine	ACAD
Middle	Palestine	Al Katah Bank
Middle	Palestine	ASALA
Middle	Palestine	FATEN
Middle	Palestine	Reef
Middle	Palestine	Ryada
Middle	Poland	FM Bank
Middle	Romania	Express Finance
Middle	Romania	LAM
Middle	Romania	OMRO
Middle	Romania	ProCredit Bank - ROM
Middle	Russia	Alternativa
Middle	Russia	Aurora
Middle	Russia	Doveriye - Volgograd
Middle	Russia	FFECC
Middle	Russia	FINCA - Russia
Middle	Russia	FORUS
Middle	Russia	SBS
Middle	Serbia	AgroInvest - Serbia
Middle	Serbia	MDF
Middle	Serbia	OBS
Middle	Serbia	ProCredit Bank Serbia
Middle	Sudan	PASED
Middle	Tajikistan	Agroinvestbank
Middle	Tajikistan	Amlok
Middle	Tajikistan	Armon
Middle	Tajikistan	Bank Eskhata
Middle	Tajikistan	FINCA - TJK
Middle	Tajikistan	FMFB - TJK
Middle	Tajikistan	IMON
Middle	Tajikistan	JOVID
Middle	Tajikistan	Matin
Middle	Tajikistan	MDO Arvand
Middle	Tajikistan	MLF Kiropol
Middle	Tajikistan	MLO HUMO
Middle	Tajikistan	MLO Mehnatobod
Middle	Tajikistan	Nov Credit
Middle	Tajikistan	OXUS - TJK
Middle	Tajikistan	Phoenix +
Middle	Tunisia	Enda
Middle	Turkey	MAYA
Middle	Turkey	TGMP
Middle	Ukraine	HOPE
Middle	Ukraine	ProCredit Bank - UKR
Middle	Uzbekistan	Daulet
Middle	Uzbekistan	Mikrokredit Bank
Middle	Uzbekistan	Renesans
Middle	Yemen	Al Amal Bank
Middle	Yemen	Al Awael
Middle	Yemen	Azal