

Micro Finance in Tanzania.

An empirical analysis of the trade off between profitability and outreach to the poor of microfinance organisations in Tanzania.



Wouter Lugard

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University of Groningen, Faculty of Economics and Business.

MSc Business Administration

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Student	Wouter Lugard S1322974 Witte de Withstraat 188 1057 ZL Amsterdam wlugard@gmail.com
University	University of Groningen Faculty of Economics and Business
Educational Program	MSc Business Administration Specialization Corporate Finance
University supervisors	Dr. L. Dam (first supervisor) Prof. Dr. B.W. Lensink (second supervisor)
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Abstract:

This research discusses the effect of the interest yield and outreach indicators on the financial performance of 63 MFOs in Tanzania. The MFOs which are analysed in Tanzania involves SACCOs, MFIs and Commercial Banks. I investigate two types of financial sustainability for all the three types of MFOs: operational self sufficiency and return on assets. Two extra variables are added for the analysis of the SACCOs and the MFIs: portfolio at risk and the operational cost per borrower. I find evidence indicating an inverted U-shape relation between the interest yield and financial performance. Moreover, the results shows a positive relationship between serving women and being sustainable, but a trade off is found between the profitability and the average loan size.

JEL classification: D82, G21, O16.

Keywords: microfinance, commercialization, corporate governance.

ABBREVIATIONS AND SYMBOLS.

AKB	Akiba Commercial Bank
BOT	Bank of Tanzania
CRDB	CRDB Bank
DCB	Dar es Salaam Community Bank
GDP	Gross Domestic Product
IFM	Institute of Finance Management
KAGERA	Kagera Farmers' Commercial Bank
KCB	Kilimanjaro Co-operative Bank
MUCOBA	Mufundi Community Bank
MBB	Microfinance Banking Bulletin
MFIs	Microfinance Institution
MFO	Microfinance Organisation.
MBINGA	Mbinga Community Bank
MWANGA	Mwanga Community Bank
NMB	National Microfinance Bank
TPB	Tanzania Postal Bank
SACCOs	Savings and Credit Cooperative Societies
SCULLT	Savings and Credit Cooperative Union League of Tanzania
UCHIMI	Uchumi Commercial Bank

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Many people have helped me writing this thesis. It was a big step for me when I decided to write my master thesis in Tanzania. Before I went to Tanzania I had no idea what to expect about my living conditions and the possibilities and problems to collect the necessary financial data. Collecting financial data and creating an image of the microfinance market in Tanzania were my main reasons of going to Dar es Salaam.

Collecting financial data of MFOs in Tanzania is complicated. It can be compared to a game drive during safari. The financial data is not public available and the MFOs are suspicious to who they provide the data. Every time it was a question of luck and you are mainly dependent on the willingness of other people to help you. Sometimes this resulted in visiting the organisations many times and waiting for hours.

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CHAPTER 1: INTRODUCTION

1.1 THE STORY OF MICROFINANCE

Microfinance has been considered in many researches as the most promising way of decreasing poverty around the world. Poverty can be described as the income level which is under the socially acceptable minimum. According to United Nations in 2008¹, more than 1,2 billion people support their lives with less than one dollar per day and even 900 million people can not buy enough food to cover their basic nutritional needs. By providing loans to the low income households, people can increase their incomes, improve their health conditions, and can decrease their vulnerability in case of a crisis. Moreover, it gives people the chance to construct plans for their futures and gives them opportunities for letting their children go to school. MFOs targets borrowers which do not have any access to formal financial institutions.

At the start of providing lending, microfinance was called microcredit. The implementation of microfinance resulted in a change of focus to lend to low-income households and new financial services were developed, i.e. supply of loans, money transfers and insurances. These new financial services have been used to expand the outreach of micro finance institutions. New initiatives were developed to extend markets, reducing poverty, create savings accounts for low-income households and create social change.

The beginning of microfinance was around the 1970's in Bangladesh. After the fierce war, the country was rebuilding and it became independent. The government acknowledge that 80 percent of the population were living in poverty. During this time there was an economist, Muhammed Yunus, who developed a way by which it was profitable to lend to poor households. He explored that the people were able to repay their loans and interest even with the lack of collateral. After experiments around the whole country, the Grameen bank, innovated group lending methods. This way of lending involves people taking responsibility for one another.

¹ Annual report 2008 of the United Nations Development Program.

The loans are provided at the group which is considered as one and the group as a whole have to repay the loan. In case of a repayment failure of an individual, the group still has to repay the loans.

In case of repayment failures, all the group members will not be able to receive a loan in the future of the specific institution. The groups are formed voluntarily and the group members select themselves. Group monitoring is very important because selecting responsible group members can decrease the default risks. The “joint liability” condition is one of the most important features of the Grameen contracts. The creation of the “dynamic incentives” of the borrowers and the information which the groups provide increases the possibilities of getting a loan. Micro finance institutions (MFIs) will start with providing small loans and in case of successful repayments, the loans will be increased. Another well known example of the start of micro finance is the Banco Sol in Bolivia, in which microfinance was a solution for the urban unemployment and the lack of cash in the informal sector. In 1992, Banco Sol was the first NGO which turned into a commercial bank, and so was the first regulated Microfinance Bank.

In the beginning of microfinance, the goals were to reach as much poor clients as possible with a non profit purpose. With help of donors, the institutions tried to expand the outreach of clients as far as their limited budget would allow it. Nowadays, due to the development of new lending technologies, it is becoming feasible to become a sustainable microfinance organisation. The growing sustainability of large MFIs and commercial banks attract new institutions to enter the market. Hereby, the competition within the micro finance sector is growing due to the development of a few aspects, i.e. change in social welfare policies, an increasing focus on economic development and job creation. Furthermore, the government stimulate self employment activities to improve the lives of the people (Gonzalez and Vega, 1998).

According to the research of Daley and Harris (2006), the numbers of Micro Finance Institutions (MFIs) in the world have been increasing in the period of the end of 1997 till 2005 from 618 to 3133 MFIs. The total number of people which have been provided a loan during this period have been increased from 13,5 million to 113,3 million people during this period. As mentioned by James Wolfensohn, president of the World Bank, this means that in total more than 600-700 million people can profit from the microfinance loans.

Due to the growing attention from politicians and the implementation of micro finance even in countries like the United States, Canada, France and Italy, the research about micro finance has been growing in the last years. A distinction can be made between theoretical and empirical research.

Mentioned in the research of Littlefield and Morduch (2005), financial microfinance services have helped decreasing the poverty of people. Moreover, they emphasize that financial sustainability is the main goal of operating in the microfinance industry without being dependent on the scarce donor and grants contributions. Sustainability can be developed through, for example, trying to take advantage of economies of scale. This research will analyse the relationship between the sustainability and the outreach aspects of microfinance programs. Hereby, microfinance organisation (MFOs) will be analysed which provides loans to the poorest people and to the “economically active” people. This distinction will be done through analyzing commercial banks, microfinance institutions (MFIs) and SACCOs in Tanzania.

1.2 RESEARCH OBJECTIVE

This research will try to provide an answer to the question why MFOs can not meet the full promise of microfinance. The microfinance promise means that microfinance organisation can be sustainable without receiving any subsidies or grants and lending to the poorest people at the same time. Moreover, this research will shed some light on the possible relationship between various aspects on the financial performance indicators for Tanzanian MFOs. Furthermore, the focus will be on the interest yield, which is charged per single MFO and its effect on the profitability of the institution.

My research analyses the differences between three kinds of MFOs. As can be seen in the chapter 2, the Tanzania micro finance industry is divided in three sectors. First are the institutions supervised by Bank of Tanzania. These are the largest players in the field. Second are the Micro Finance Institutions with have between 80000 to 1000 borrowers. The last group is formed by the SACCOs. This group forms the biggest group because more than 3000 are operating in Tanzania. The informal small community based organisations are not included in this research.

The focus of this research is on different types of organisations with respect to different kinds of lending schemes. Nowadays, in the banking sector, there is a shift from the traditional group lending to the focus on individual loans. As can be noticed, there has been a shift towards commercialization in the microfinance sector. Mostly this may result that poor borrowers are excluded for loans. However, MFIs and the SACCOs still remain large providers of microfinance loans and they focus at both group lending and individual lending. Morduch (2000) has shown that MFI and SACCOs are still dependent on subsidised finance which leads to low incentives to work efficient and spending money in a responsible way.

The research hypotheses of this thesis are based on the four advantages of Vinneli (2002), focusing on the self sufficiency of organisation. Vinneli mentions the importance of self sufficiency, because self sufficiency determines the organisational survival and so the provision of financial services, and therefore provides a sign of trust for the borrowers. Second, being sustainable means that you offer products for which the prices are determined by the market and so it will be possible to offer financial services also to the poor borrowers. Third, it gives operating freedom due to the independency from subsidies. Fourth, MFOs create a higher incentive to understand the business and to work efficiently.

The main purpose of this research is to show if there is a relation between the average loan size and the interest yield with the financial performances of MFOs. Moreover, control variables are added which provides results which can be compared with previous research. This research will measure which indicators contribute to the profitability of the MFOs in Tanzania. The contribution of this research will be an empirical foundation for the microfinance promise and furthermore it will analyse if management decisions create sustainability.

The remainder of this thesis is structured as follows. Chapter 2 will give a summary of the microfinance characteristics in Tanzania. Chapter 3 will be an overview of previous theoretical and empirical research about microfinance and will mention the hypothesis for this research. Chapter 4 sets out the dataset which is collected in Tanzania and will mention the methodology which will be used.

Chapter 5 provides the empirical results, while Chapter 6 will mention the conclusion and will provide recommendations about future research.

CHAPTER 2: AN OVERVIEW OF MICROFINANCE IN TANZANIA

2.1 STATISTICS ABOUT THE POPULATION OF TANZANIA

Political Structure

Tanzania became independent in 1961. Since the independence, has Tanzania be considered as one of the most politically stable countries within the continent Africa. Tanzania is characterized as a country with two capitals. Dar es Salaam can be considered as the commercial capital while Dodoma is the political capital. The political system has been transformed from an one party system to a multiple-party political system without political upheavals. The executive power lies in the hands of the president and his party Chama cha Mapinduzi. The political transparency is limited and the democratic decision making process is limited. The current president of Tanzania is Jakaya Kikwete.

Characteristics poverty

After the independence, Tanzania remained one of the poorest countries in the world. More than half of the population are maintaining their lives with only one dollar per day. 70% of the population lives in rural areas and are running low profitable agricultural activities. The agricultural output is dominated by the selling of maize, sorghum, millet, rice plantains, wheat and pulses. The HIV/AIDS problem is less profound compared to bordering countries, but still is HIV/AIDS the main cause of death for the group of 15-49 years.

The GDP in the country has been growing rapidly in the last years. However, the decline of poverty in rural areas is small. The sources of income differ around the country². In Tanzania 23% of the population earns their money by running own businesses, while 38% of the population are concentrating on agricultural activities. Only 3% works in the formal sector, while 6% in the informal sector. 18% do not earn any money and are mostly dependent on the willingness of family or friends and 4% does not have any income at all. At all levels within the society, corruption plays a large role.

² Finscope: Workshop for micro finance, 7 June of 2007.

General Economic development

The Tanzanian economy has shown a large increase in the last couple of years. Since 2000, as one of the highest growth in Sub-Saharan Africa, the GDP of Tanzania has been growing with an average of 5% per year. However, agricultural and electricity generation has shown negative impacts, as can be seen at the decrease in growth for agricultural activities from 5,2% in 2005 to 3,6% in 2006. A sharp decline in the hydro generation capacity resulted in a 2% decrease in the manufacturing industry during 2006.

The large grow of the last couple of years is created by the mining industry, the construction industry, tourism, and manufacturing sectors. Furthermore, the trade deficit has been increased in the last two years due to the increase of energy and capital related imports. However, Tanzania still relies on subsidies and international donors are presented in that this part is still 11% of the GDP.

Population characteristics

The population in Tanzania is divided in 46% men and 54% women. As mentioned before, 72% of the population lives in rural areas while only 28% in urban areas. Of the almost 40 million inhabitants of Tanzania, 14 million is below the 16 years old. A large segment of the population does not enter school. Only 12% goes to pre-primarily school, 54% only goes to primary school, 11% goes also to secondary school and only 1% has the opportunity to go university. Even 14 % has no formal schooling what so ever. Education is the most important factor in assessing the financial services industry, while those with less education have minimum access to these services. However, nowadays all children have access to primarily school and their access to secondary school is extending over the coming years. A major challenge lies in the size in the group under 16 years old. It is a large role for accommodating to be successful in the future.

Figure 1³
Knowledge about financial services.

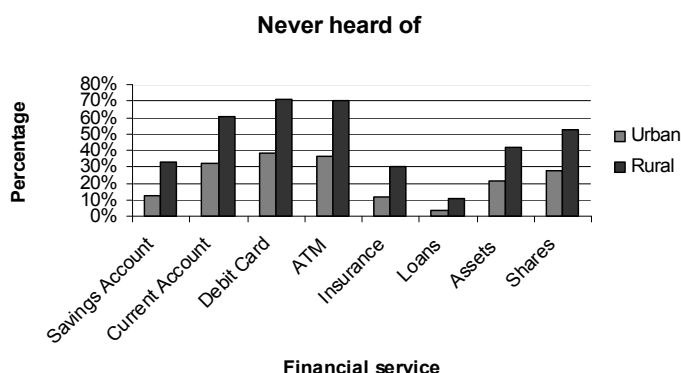


Figure 1, shows the financial literacy of the population. Due to the level of education, a large percentage of the population are not familiar with financial services and the products they offer. This minimum knowledge creates problems related to borrowing money or opening savings accounts. Due to the increase education level for kids, this development may decrease over time.

Access to financial services

The access to financial services is particularly low. The formal sector which are supervised by financial services which are regulated includes banks and insurance companies, are accessed by only 9% of the population. The access to the informal sector including SACCOs and MFIs is only 2%. The informal small community based organisations like ROSCAs, Village Community Banks or moneylenders are accessed by 35%. These organisations provide group lending within villages or regions. The last group of 54% or 21 million people in Tanzania is even financial excluded totally, and this includes people who do not save, borrow or transfer money at all.

2.2 CHARACTERISTICS OF MICROFINANCE IN TANZANIA

The financial sector and especially the micro finance sector are relatively young. To sustain economic growth, Tanzania embarked on financial liberalization in 1992. The liberalization of interest yields, restructuring of state-owned financial institutions and supervision of financial institutions are elements at which the financial sector has made large changes. During the last five year the sector is booming due to the mobilization of

³ Finscope: Workshop for micro finance, 7 June of 2007.

financial resources, the increased competition and the enhanced quality and efficiency in credit allocation.

The total bank sector has been increased from a total bank assets of 1355 billion Shilling (1,12 billion dollar) to 8131 billion shilling (6,7 billion dollar). This growth has been realized due to the entry of new financial institutions.

Analyzing the banking sector, a few market trends can be noticed. There has been a continuing development in the effort to enter low income market by providing services for retail clients. Furthermore, there is an increase in the focus on (peri-)urban areas by Commercial Banks, MFI and SACCOs. By offering more financial services due to new technologies like for example electronic banking, more clients can be reached. Furthermore, all the major banks have ATM's at this moment. The entrance of ATMs can improve the pace of electronic payment systems. Moreover, the increase of electronic payments can decrease the risks which are related with holding cash. Also entering is the new product of mobile phone banking. This development can have two advantages. Due to mobile phone banking, the lower money transactions can be improved and the call for branch infrastructure can be reduced.

Despite the innovations, the microfinance market must be improved qua transparency. The microfinance market in Tanzania is an imperfect market. There is a lack of information for the providers and the borrowers. Even though information would be available, the borrower must have some level of financial literacy to be able to make proper comparisons. It would contribute if MFOs would add educational objectives while lending to borrowers. This can increase the financial literacy and finally this might lead to a higher quality of the portfolio. A better financial infrastructure would also contribute to the transparency in Tanzania. The role of financial regulators can be important for providing policies and training for the staff of the institution. A better communicative infrastructure can be created by consumer credit bureaus, which already have been developed in Uganda. This communicative infrastructure allows borrowers to build up a good credit record, which must be accessible to competing lenders.

Over the last ten years there have been some significant changes in the national policies regarding micro finance. In 2000, the government have been developed a National Microfinance Policy, which involves a clear vision about the development of a more

sustainable micro finance sector. This policy focuses mainly on the private sector which provides the financial services. Furthermore, the government focuses on the support of the strengthening the SACCOs. Due to mismanagement, poor governance and the excess of costs paid from the saving of poor rural clients, the SACCOs were managed ineffectively.

In Tanzania there is a legal framework of institutions, called the Bank of Tanzania (BOT) supervised institutions. These institutions are legalized and regulated and are required to have a minimum of capital requirements. They have become providers of financial services to micro, small & medium enterprises customers. To be classified as a Commercial Bank, you need to have a minimum total loan size of 5 billion shilling (\$4,255,319) , a regional Unit Commercial bank should have between 50-200 million Shilling (\$43,550-\$170,212) and for a Non Bank Financial Institution the total loan size requirement is 50-100 million Shilling (\$43,550-\$85,106).

Besides the BOT supervised institutions there are MFIs. These NGO types of organisations are important providers of micro loans. These institutions are unregulated although they are involved with governmental authorities. The biggest group of MFOs is the SACCOs. These institutions are registered by the Ministry of Cooperatives and Marketing. The annual external audit of the institutions is done by the Cooperatives Audit and Supervision Cooperation.

2.3 THE MICROFINANCE ORGANISATIONS IN TANZANIA

For about a decade and a half, the Government of Tanzania has been reforming the financial sector in order to improve an efficient and effective financial microfinance system. This resulted in an increase in microfinance providers in the form of banks and non-banks financial institutions.

Supervised and Regulated Institutions.

In Tanzania there are twelve BOT regulated institutions which provide micro finance services⁴. The largest of these institutions is the NMB bank. The NMB bank has more than 200 branches represented in every region and almost every town in Tanzania. The total loan portfolio of the NMB is almost \$ 300 million. The CRDB bank is also a large player on the micro finance market and has 40 branches nation-wide. CRDB provides micro finance services with the help of SACCOs. In total 270 SACCOs are connected with the CRDB. Akiba Commercial Bank is the other large commercial banks with in total 5 branches in the nation and offers services to more than 15000 clients.

The focus of the commercial banks for micro financial services to low income households has also to do with the expansion of their customer network. By informing the clients about other financial possibilities, commercial banks try to expand their retail and wholesale level. Also mentioned by the Hermes and Lensink (2007), commercial banks will use their subsidised loans to provide loans to poor clients to enlarge the financial portfolios. Due to providing loans, it is assumed that the clients increase their wealth and so will be able to use financial services in the future. However, the entrance of commercial banks results in a higher competition for the MFIs and SACCOs.

NGOs.

MFIs can vary between the legal structure, missions and methodology. Mostly MFIs focuses on clients who have no financial access to banks or other financial institutions.

Due to the introduction of the Microfinance Companies (MFC) and Microcredit Activities Regulations in 2005, MFCs were allowed to take deposits of the public under supervision of BOT. For NGO's this development is very interesting because these new development make it possible to attract new investors and mobilize customer deposits. Furthermore, it must become possible to reach the customers which are not suitable customers for the banks. While several NGOs, like SEDA, FINCA and PRIDE, are excited by the opportunities of attracting savings from the public, the conversion to a MFC is a daunting challenge because of the strict requirements and the length of the transformation.

⁴ These banks are NMB, CRDB, DSM Community Bank, Akiba Commercial Bank, Mbinga Community bank, Uchumi Commercial Bank, Kilimanjaro Co-op Bank , Mufindi Community Bank, Kagera Farmers Co-op Bank, Mwangi Community bank, Tanzania Postal bank and Access bank.

There are a few main micro finance players in Tanzania; PRIDE Tanzania (around 80000 borrowers), FINCA Tanzania (around 43000 borrowers), SEDA (around 17500 borrowers), BRAC Tanzania (around borrowers), Presidential Trust Fund (around 10000 borrowers). Moreover, there are a few smaller NGOs operating as SEF and FAULU (both around 2000 borrowers) and SELFINA which is specialized in micro leasing (around 1000 borrowers).

New institutions are also entering the market in Dar es Salaam like Tujijenge Africa (around 6000 borrowers) and Easy Finance (around 1100 borrowers). The strength of Tujijenge Africa is that they are independent on subsidies. Their business structure involves shareholders, which will be entitled to get a dividend after three years. The presence of shareholders, stimulate Tujijenge Africa to work efficient and used microfinance methods to be sustainable. Tujijenge Africa is only operating for one and a half year now, providing more than 6000 clients and were financial sustainable within 12 months.

SACCOs.

Savings and Credit Cooperative Societies are the main providers of micro finance services in Tanzania. They have remained the most prevalent form of financial intermediary's in particular rural areas. Currently there are 1500 SACCOs in the country with total members of 420000⁵. Most of the SACCOs are small and registered with the Ministry of Cooperatives and Marketing.

At this moment, SACCOs are considered to be unprofitable. Due to the limited financial products, the inadequate management knowledge and the unsustainable interest which is charged, the SACCOs are dependent on the help of donors and grants offered by the government or foreign investors. To become sustainable, external supervision and support must be provided in order to let them operate efficiently and let them to grow. Furthermore, more focus must be put on the quality and training of the management and the improvement of auditing⁶. Like in Kenya, a lot of networks are developed which offers services to improve the business. Mostly SACCOs own shares in the intermediary

⁵ Source: Registrar of SACCOs, December 2006.

⁶ Source: Claude Belanger, Employee at Dunduliza Limited.

institutions and they pay for the services. The advantages of SACCOs networks can be a large. Due to the problems of mismanagement, lack of financial literacy and fraud are common aspects within SACCOs, financial control of SACCOs networks can contribute to a more sustainable way of operating.

CHAPTER 3: LITERATURE REVIEW AND THE HYPOTHESES.

This chapter is divided in three sections. The first section will set out theoretical research about the reduction of moral hazard problems and the adverse selection problem. Moreover, it will mention researches which have been focusing on group lending. The second section will give an overview of theoretical and empirical research about the relationship between sustainability and outreach variables. In the third section, the hypotheses are constructed.

3.1 STUDIES REGARDING THE AGENCY PROBLEMS

MFOs in Tanzania are using a lot of lending technologies and innovative contracts to decrease the default risks. The risks of microfinance activities can be divided into two dimensions.

First of all, MFOs face the problem of “adverse selection”. The adverse selection problem explains that an organisation does not have all the *ex ante* information about the riskiness of a borrower (Armendariz de Aghion and Morduch, 2005, p.7). The uncertain reliability of the borrower normally drives up the interest yield charged by the MFOs. However, because the MFOs do not know who the reliable borrowers are, higher interest yields are not the solution. The higher interest yields can lead to an imperfect market because the demand of good borrowers can result in the presence of mainly risky borrowers.

The second problem is the “moral hazard” problem. The moral hazard problem is related to the difficulties of observing the effort of borrowers, e.g. *ex post* information problems. (Armendariz de Aghion and Morduch, 2005, p.7). The *ex ante* moral hazard contains the efforts or actions which are taken before project returns have been created. This measures the actions which influence the probability of positive returns. The *ex post* moral hazard deals with the problems which institutions faces when repayment efforts are analysed. The problem of monitoring borrowers is that it can be complicated and expensive to control the profitability of the businesses of the borrowers. However, the monitoring control function is very important, because in case of failure, the borrower will not be able to repay the loan.

These two problems represent the classical agency problems which MFOs face. The agency problems create difficulties to monitor the quality of borrowers, control the businesses returns and analyse the effort to repay the loans. The uncertain lending environment creates loans which will be granted at high interest yields.

The problems may be decreasing when MFOs would focus on providing larger loans. Larger loans are able to cover the monitoring costs while individual small loans are not. The larger loans are mostly provided to people who have a solid lending history and run proper businesses. Commercial banks are mostly characterised by providing loans to this poor “economically active” borrowers due to the implementation of strict lending conditions which the poorest people are not able to meet.

The given problems do not imply that it is impossible to borrow as a poor borrower since there are also informal parties, like moneylenders, which provide loans (Armendariz de Aghion and Morduch, 2005, p.8). These moneylenders are mostly people who live in the same village as the borrowers and they have the advantage of knowing the borrower because there are less informational asymmetries and hence less agency problems. The disadvantage of moneylenders is that they have limited resources and the interest yields which are charged can be 150% per year (Varian, 1990).

The agency problems can be eliminated when methods would be developed to make monitoring cheaper and decrease the transaction costs per loan. Problems within individual loans can be solved through innovative lending repayments schedules. The schedules can be based on weekly basis for the smallest loans or on monthly basis for the larger loans. Due to the frequent repayments, the risk for the banks will be reduced. Gonzalez et al. (1998) discovered that repayment schedules only work in case the opportunity costs are low and there is an ability to save. However, problems can occur when a business is highly seasonal occupied. Weekly repayment schedules are hard to accomplish in that case. The Grameen Bank proposed therefore the “Grameen Bank 2 repayment method” which allows borrowers to vary the loan repayments per week according the season (Yunus, 2000). Rutherford (2000) measured in his research the advantage of weekly repayments. He mentioned that weekly repayments would result in recognitions that besides repayments, savings also can be done in weekly amounts. He noticed that saving small amounts can become a big lump in the future. Hereby, he

emphasizes the importance of microfinance, which can be the basis of expanding financial literacy.

Another well-known solution for agency problems is offering collateral. This means that assets would cover the costs in case of the failure of repayments, i.e. a mortgage for a house. However, the main goal of microfinance is to serve poor people which mostly have a lack of collateral. A solution within the collateral problem is the flexible approach. Some institutions do require collateral. The best example is the Indonesian BRI; which considers collateral as sufficient value for the borrower. Instead of determining the expected sales value of an asset, they focus at the notional value of the asset. This means that items are included which have personal value for the borrower.

Another type of collateral which is used by banks is that borrowers have to save money before they become eligible to borrow. This has the advantage that the borrower shows that it has money and the incentive to repay future loans. For example the SafeSave of the Dhaka slums has a policy where borrowers have to save for three months before they are accepted as borrowers. The loans which are provided are related with the amount which had been saved. Demonstrating the ability of savings shows the characteristics of discipline and money management skills. Furthermore, it provides a deposit at a bank which can provide a security for loans.

Microfinance to women is very important in expanding the outreach. According to UNDP Human development report (1996) 70 % of the world poorest, around 900 million, tend to be women. Moreover, Mody (2000) discovered that 80% of the clients of the largest 43 MFIs in the world are women. The wide focus on women can be explained by many factors.

Borrowing to women can be profitable way for MFIs. Hossain (1998) shown that women tend to be more reliable then men when it comes to repaying loans. In his research it has been shown that 81 % of the women had no repayment problems, while men this part was only 74%. Rahman (2001) finds that women tend to be more sensitive to the social pressure and verbal hostility of institutions when repayment problems occur. Thereby women are less mobile then men. Because women work in or near the home, bank managers can monitor the women at a lower cost. Moreover, less mobility delegated monitoring in the group lending process. Due to less mobility it is easier for a group to monitor each other.

According to Goetz and Sen Gupta (1996) women are also more risk averse than men, and are more conservative in their choice of investment projects. The dynamic incentives of the women are also larger due to the limited possibilities of sources of credit, while men have more possibilities by formal and informal credit institutions. Hossain (1998) shown that women tend to be more reliable than men when it comes to repaying loans. In his research it has been shown that 81 % of the women had no repayment problems, while only 74% of the men had no repayment problems. Rahman (2001) finds that women tend to be more sensitive to the social pressure and verbal hostility of institutions when repayment problems occur.

Besides the advantages of lending to women it has also been shown that lending to women has a large economic and social impact. Skoufias (2000) has shown that in rural Mexico poverty decreased by ten percent, school enrolment of children increased by 4% , the food expenditures increased by 11% and the health of adults improved considerably. Because of lending to women, expenditures are increasing at health, education and housing as well as child health. Furthermore, microfinance can be used as a way of promoting the role of women in the household. Hashemi, Schuler and Riley (1996) showed that in Bangladesh, the violence against women has been reduced.

As can be seen, a lot of research emphasizes the increased gender empowerment, but there has also been some criticism on this. Adams and Meyoux (2001) emphasize that credit alone might not be enough to change the role of the woman within the household. They argue that institutions must also provide training to the women to expand their skills, because unskilled women will have fewer opportunities to find work outside the house. Microfinance can improve their way of living and may improve their role in the household but this will be all short term. If microfinance really wants to improve the role of the women in the formal sector, programs which add value to skills, education and consciousness-raising must be included. However, due to high costs involve with these programs, microfinance institutions must investigate if these can be paid out of subsidies and donors.

Besides the principal agent problems which micro lenders face with borrowers, problems can occur within the MFO itself. It is difficult for the top management of a microfinance organisation to observe all the actions of the managers who are responsible for lending.

Therefore, a reward system can be developed to effectively maximize the objectives of the organisation. The focus of contractual relationships has been analysed by Mirrlees (1974). He discovered that contracts with hard punishments could work, but he also mentioned that not everyone would agree to the conditions. This phenomenon is called the participation constraint. The trade off between risk and incentives is a common issue and it is important to find a mix between the two factors to construct an optimal employee contract. This mix can be formed by a combination between a fixed income and a part of the contract which is bonus related to outcomes.

Microfinance is constructed in an environment where information problems and lack of collateral has to be overcome to decrease the poverty. Group lending is a solution for these problems. Strand of literature focuses on the theoretical framework of “joint liability” condition. Models by Stiglitz (1990), Armendáriz de Aghion (1999) and Varian (1990) focus on dealing with the moral hazard and the lack of information problems and were mentioning how group lending and “joint liability” in particular could resolve these problems. The advantage of group lending is mostly based on a two tier approach. First credit will be provided to improve the self employment of the clients.

Second, non credit services will be offered, like vocational training, organisational help and social development skills to improve financial literacy, health, business skills and social empowerment. The social empowerment focuses at the practical way to handle with health problems and poverty. As in most cases, group-lending has also its disadvantages (Giné and Karlan. 2006). They mentioned that not all members like the group tension. The responsibility which is involved with group liability can have large consequences for the lifestyle of individual households. Furthermore, group lending can increase the number of bad borrowers due to the “free riding” which can occur when the group will repay the loans in case of default. This development can finally result in a drop out of good borrowers because they have to repay for other group members. Currently, there has not been a clear answer to clarify the merits of group lending or individual lending. Due to the use of different group lending types, it is hard to make a reliable comparison.

Despite these disadvantages, group lending has shown to work properly. This can be seen from that the programs are also viable for the poverty allocations in developed countries.

Countries as the United States, France, Italy and Canada already implemented the strategies (Rahman, 1993).

3.2 *STUDIES REGARDING SUSTAINABILITY*

A lot of research has been conducted about the sustainability of MFIs. The high transactions costs, the adverse selection problem, the lack of exchange of information and mismanagement have been aspects which has a large influence on the profitability of an institution. Since the 90's the focus has been on the "win-win" situation, which comprises of both reaching poor borrowers and being sustainable. The financial performance of an MFI can be analysed with the help of two different approaches mentioned in the book of Robinson (2001). These are the financial system approach and the poverty lending approach. The financial systems approach involves the financial sustainability of an organisation, while the poverty lending approach focuses on the use of subsidies and grants to reduce the poverty in a country.

The difference between these two approaches is that the financial system approach focuses on the fact that subsidies do not automatically result in sustainability and a reduction of poverty, while the poverty lending approach emphasizes that the absence of subsidy will lead to high interest yields which the poor people can not repay. Moreover, the poverty lending approach argues that the focus must be on the outreach and not the sustainability because otherwise the poorest borrowers would be shed out of the portfolios due to the high costs and difficulties to monitor the borrowers. According to Dichter (1997), sustainability can be described as being efficient and intend to operate without being dependent for subsidies and donors. He views sustainability as an important tool to build development economies of scale.

The research that analyses sustainability, focuses mainly on the consequences of being sustainable related to the number of clients served and the socioeconomic level of the clients. The research can be divided into the theoretical approach and the empirical way of analyzing sustainability. As mentioned in section 1.2, sustainability depends on the loan officers which decide if a loan will be provided. Mosley (1996) and Morduch and Rutherford (2003) analysed the role of these loan officers. Mosley (1996) investigated the conflicts which can occur between the financial self sufficiency and the reducing of

poverty. The average loan size was used as an indicator for the poverty. He considered that when the average loan size decreases, poverty reduction occurs. The results show that financial self sufficiency is positively related to the increase of average loan sizes. The problem with finding the perfect mix depends on the priorities which the loan officers have. It is a way of thinking about the optimal incentives concerning the trade off between risk and incentives and further between loan size and quality. Gonzalez and Vega (1997) found that providing monetary incentives, could lead to ignorance of social cohesion and so the shared mission of the organisation can be neglected.

Morduch and Rutherford (2003) have found that the main micro lenders in Bangladesh try to set understandable targets which make sure that a future growth of the organisation will be realized. Furthermore, they show that organisations are successful when they give their loan officers special feeling in case they provide loans to the poor people. Prodem, a MFO in Bolivia, have found a balance between low-powered and high powered incentives. They have found that strong cultural norms are important to let the loan officers strive to maximize the social shared mission.

Devine (2003) has examined the increasing number of NGOs in Bangladesh during the period of 1990-2000. He discovered an increase of NGOs of 395 to 1223 nationally. His analysis showed that the NGOs which implemented strict microfinance regimes, were the most successful based on financial considerations. However, this has consequences for the NGO-member relationship. Due to the more strict lending agreement and corresponding restrictions, the operating freedom of the members decreased. The main conclusion of the paper is that NGOs which want to be sustainable must focus on the members needs, because the poor are the primary beneficiary of the NGOs. Therefore, the main focus must be to develop strategies to provide loans constricted by responsible policies.

Duflos et al. (2007) did research in Pakistan about microfinance performances. They discovered that the MFIs even had difficulties with being sustainable when they receive donations with a value of 400 million dollar in total. Due to low quality management these institutions were not able to grow and were not able to develop diversified products. They found that microfinance in Pakistan receives a lot of attention on the aspect of reducing the poverty while the focus on good management and product diversification was reduced to a minimum.

More research has been done about sustainability and especially about the microfinance promise, also called the win-win situation, which can be considered as the possibility to be sustainable and to lend to the poorest people.

Morduch (1999) examined the win-win hypothesis but he mentioned that this situation is not accomplished yet by significant results. He emphasizes that organisations must concentrate on developing innovative mechanisms focused on poor borrowers. In this respect, strong leadership and strict lending conditions are required. Furthermore, he emphasizes the importance of subsidies, which must cover the high costs involving the small loans. Moreover, he suggested that a change of management structure can be a solution in which donors are used to experiment and evaluate new lending technologies instead of just reproduce existing programs. Therefore, the microfinance puzzle can be achieved but only if innovative lending systems will be developed and the subsidy will be used efficient and will stimulate sustainability.

Rhyne (1998) agrees that the relationship between sustainability and outreach can occur when the MFOs would concentrate on the aspects which cause the trade-off. In her paper, she analyses the microfinance promise by taking the mathematical view and the situation will be analysed if subsidies are required to cover the costs. Because sustainability and outreach are constraints for one another, a solution for the dual maximization can not be created. The main goal is to find a specific point in which a maximum value of amount A versus the amount B will be found. In economics this relationship is labelled the production possibility frontier. In microfinance, it is possible to place the sustainability and the outreach near to each other on the frontier. However, this will result in a trade off between each other. She emphasize that especially the interest yield is an important aspect in this analyse, because the height of the interest yield is related to the demand of the loans. If a higher interest yield results in a decreasing demand, subsidies must be used to cover the costs and will it be difficult to be sustainable and to expand the outreach. However, if the interest yield is high enough to cover the costs and will not lead to a decreasing demand, the win-win situation can occur.

Pollinger et al. (2007) examined the US microfinance pricing models with the help of the relationship-based microfinance model, based on the factors marketing, origination, loan monitoring and overhead costs. Results showed that the average portfolio risk were

surprising low. The occurrence of commercial banks on the micro finance market decreases the prices in the market. An interesting result is that MFIs which has subsidised finance have a less understanding of their true operational costs. This can mean that due to subsidies, the incentives to work efficiently are reduced. Therefore, they emphasize that even with the need of subsidies, MFIs must be motivated to innovate financial services and try to become operational efficient.

There have also been three researches which have developed an empirical way to investigate the relationship between sustainability and the outreach level. The research of Lafourcarde et. al. (2005) and Cull et al. (2007) and Crombrugge et al. (2007) are the basis for my research.

Lafourcarde et al. (2005) have done an empirical research about the financial performance, the outreach level, and the productivity of 163 MFIs in Sub-Saharan Africa. They found that African MFIs serves the most clients and have the largest savings mobilization in the world. The results indicate that the operating costs are still too high, resulting in lower financial performances than other regions in the world. Due to operating mostly in rural areas, which involves low population intensity and bad infrastructure, operating expenses are too high. Moreover, they mentioned that the efficiency can be increased with help of new financial services and an increased transparency to the clients. High quality of services and innovation of new products are important aspects to handle to growing competition. Also, an intensive internal scan must be used to analyse the strength and weaknesses, risks, the future targets and try ways to attract foreign investment.

Crombrugge et al. (2007) have been analysed the factors which contribute to the operational self sufficiency. In their research they observed 42 Indian MFIs in corporation with Sa Dhan, which is an organisation to which the MFIs report their financial data to. During the period of 2004-2005, they examined the relation between the three financial performance indicators, (operational self sufficiency, repayment of loan and operating costs per borrower) and a set of explanatory variables. The research pointed out that a high interest yield causes an increase in PAR. They found that an interest yield of 55% would maximize the financial self sufficiency. They also found an inverse U-shaped

relation for the average loan size. The role of the percentage of women borrowers was insignificant.

Cull et al. (2007) have discussed the microfinance promise in which the relation between problem financial performance and outreach is evaluated. They consider MFIs as organisations which earns less profit while facing high repayment performances. In the study which analysed 124 institutions operating in 49 different countries, they observed the effects on profitability, loan repayments and cost reduction. They distinct institutions based on the kind of lending provided, i.e. individual lending, group lending and village banking.

The research pointed out, in line with other research, that a higher interest yield does have a positive effect on the profitability by providing individual loans. However, as found in the research of Crombrugge et al. (2007), this only occurs until a certain threshold value. However, the interest yield had no significant effect for institutions providing group or village lending.

The other outreach variables did not have a significant effect on profitability; however, they found that individual-based lenders do face a mission drift, in which they focus more on the wealthier clients. This result was not discovered by the providers of group lending and village banking. Most important aspect of this research states that providing different type of loans does results in different relation between profitability and outreach variables.

3.3 HYPOTHESIS

According to the publication of the Bank of Tanzania⁷, it is mentioned that start up costs for MFOs are usually high and it can takes years to operate efficiently. During the start up stage it is crucial that MFOs receive donors and grants. Despite the subsidies and grants faces MFOs in Tanzania problems to reach an equilibrium in which MFOs can cover their costs. This break even criterion is considered to be important because it enables financial support of commercial banks in case of difficult times.

As mentioned in section 2.2, it can be seen that commercialisation has been increased within the microfinance sector. This commercialisation creates a change in focus on

⁷ The second generation Financial sector reforms. Background paper to the implementation plan, vol. 2. June 2007.

“economically active” borrowers, or large borrowers, instead of the poorest borrowers. This change shows that financial sustainability has become more important. Financial sustainability and the expansion of the growth of a MFO can result in increasing economies of scale and more poor people can be reached. If providing loans to the poorest borrowers leads to an increased financial performance, a ‘win-win’ situation within the microfinance sector would occur (Christen et al., 1995; Otero and Rhyne, 1994). However, the shift to commercialization can result that the MFOs focus on the larger borrowers, and do less frequently lend to the poorest borrowers. This development would have negative effects for the poorest borrowers. Therefore, the increased competition which can lead to an increased efficiency would be in favour of the larger borrower (Mcintosh, de Janvry and Sadoulet, 2005). The recent shift of the commercialization would go against the traditional purpose of microfinance, which is providing loans to the poorest people.

This research tries to answer if the average loan size has an effect on the financial performance. As mentioned by Mosley (1996), the average loan size can be used as an indicator for poverty. By analyzing the average loan size, I want to analyze if decreasing the average loan can lead to an improved financial performance. If this occurs, it can be an indication that the ‘win-win’ situation may occur for MFOs in Tanzania. The following hypothesis is formed to analyse the possible relationship between the outreach variable and the financial performance.

***H₀:** There is a trade off between the financial performance and expanding the depth of outreach to the poor for MFOs in Tanzania.*

***H₁:** Financial performance and expanding the depth to the poor for MFOs in Tanzania are complementary to each other.*

The research of Stiglitz and Weiss (1980) emphasizes that a higher interest yield is charged to protect a MFO against the risk of the adverse selection and moral hazard problems. A higher interest yield might create a higher profit but may also affect the repayment rates. My research will focus on the effect of the interest yield related to financial performances indicators. Cull et al. (2007) has shown that the interest yield has a hump-shaped correlation with the FSS. The hump shaped correlation shows that the

profit will increase to a certain point, where after this certain interest yield the profit will decrease. The maximum threshold is in line with the theory which assumes that the borrowers can not afford to take the loan without getting into financial difficulties. The presence of risky borrowers will decrease the incentive to repay the loans and so decreasing repayment rates will occur. Based on these results, the following hypothesis is constructed and will analyse the effect of the interest yields on the financial performance for different types of MFOs in Tanzania.

H_0^ : An increasing interest yield will increase the financial performance.*

H_1^ : A decreasing interest yield will decrease the financial performance.*

The average loan and the interest yield will be the independent variables which will determine if the H_1 and H_1^* can be accepted. H_1 will be accepted in case a decreasing average loan size will result in an improving financial performance. H_1^* will be accepted in case an increasing interest yield is complementary with an increase of the financial performance. Besides, these two explanatory variables, I have added control variables, which will be used to compare with the results of previous research. The description of the dependent and independent variables will be done in chapter 4.

CHAPTER 4: DATA AND METHODOLOGY

4.1 DATASET

This research uses an unique data set of 11 Bank of Tanzania regulated microfinance banks, 9 MFIs and 43 SACCOs in Tanzania. The financial data comprises of one observation per microfinance organisation in the year 2006 or 2007. The financial data will be used to make a comparison between the different organisations with respect to sustainability and outreach variables. The construction of the dataset aims at acknowledging the three different MFO designs and can be considered as a representative sample of the microfinance providers in Tanzania. The data of the MFOs are used anonymous.

Besides the comparison between different MFO designs, this research also takes regional differences into account, by using a dummy variable. In total 34 of the 63 MFOs are operating in rural areas. According to Lafourcarde et al. (2005), lending in rural areas is considered to be more risky. In addition, due to the higher transactions costs and transportation costs, the profitability can be lower in these areas.

The data set is collected from different sources, i.e. websites and institutions. The financial data of the SACCOs were provided by individual SACCOs after a personal request. In total, I have visited 10 SACCOs in Dar es Salaam by myself⁸. Furthermore, Dunduliza, which is an umbrella MFO of 33 SACCOs, helped me with the financial data of their member SACCOs. With the help of their internal database, it was possible for me to collect the necessary economic variables.

The financial data of the MFIs were provided by MIX Market tm (a micro finance platform) and Micro Banking Bulletin (MBB). These two websites can be considered as a worldwide online centre which provides information about MFIs. The financial data, based on outreach and profitability, is constructed of audit financial statements. In Africa, more than 300 MFIs are included in the database of MIX. A quarterly magazine is also published by MIX Market tm involving different micro finance problems and current

⁸ Church, Ushirika, Dovya, Tuico, Urafiki, Mtoni, Lumumba, Chaku, Yosefo, Cdefu.

trends signalled by financial providers. This research has used the online database for 8 of the 9 MFIs in the dataset. Tujijenge is a MFI which I have visited during my time in Dar es Salaam.

The financial data of the Bank of Tanzania regulated commercial banks were provided by Ernst & Young. The financial data of the commercial banks were published in the first edition of the banking review of Tanzania of 2008 (June).

Table 1
Overview of the MFOs and their characteristics

	Number of observations	Percentage	Total borrowers *(1000)	Total loan size portfolio *(1000\$)
<i>Type</i>				
SACCOs	43	68%	82	5.577
MFIs	9	14%	224	34.548
Commercial Banks	11	17%	991	935.035
<i>Area</i>				
Rural	34	53%	80	12.916
Urban	29	47%	1217	962.244
Total	63	100%	1297	975.160

The total borrowers represent the total borrowers per institutional type. This is equal to the total loan size portfolio.

This dataset involves a total of almost 1,3 million microfinance borrowers and a total loan portfolio of 975 million dollar as can be seen in table 3. Furthermore, it can be seen that commercial banks are having much more borrowers than the other two types of MFOs.

As can be seen in table 2, the descriptive data of the three different types of MFOs provides interesting results. It can be seen that commercial banks are the most profitable MFO. Moreover, the MFIs perform better than the SACCOs regarding the OSS, while the ROA do not show large differences. This might be an indication that commercial banks operate more efficiently due to the control of the Bank of Tanzania. Moreover, economies of scale can be an explanation for this pattern. The total amount of borrowers is a proxy for the institution size of the MFO.

There are large differences in the percentage of women borrowers. The presence of women borrowers is much higher for MFIs compared to the SACCOs. The higher presence of women borrowers can be an indication for the higher financial performances of the MFI. However, this is in contradiction with the research of Hossain (1988), which shows that a higher percentage of women borrowers do not have to result in a higher

profitability. It can be seen that the variables percentage of women borrowers and the PAR after 30 days are not available for all the MFOs. This is related to the difficulty of obtaining such data for the commercial banks.

Table 2
Overview of the descriptive statistics of the dataset

Indicator	SACCOs			MFIs			Commercial Banks		
		Mean	Standard Deviation		Mean	Standard Deviation		Mean	Standard Deviation
<i>Financial performance</i>									
Operational Self Sufficiency (OSS)	N=43	86%	29%	N=9	102%	29%	N=11	117%	7%
Return on Assets (ROA)	N=43	-3%	9%	N=9	-3%	10%	N=11	3%	3%
<i>Outreach</i>									
Borrowers (in 1000)	N=43	1,91	1,62	N=9	24,91	30,72	N=11	90	167
Percentage of women borrowers	N=43	42%	24%	N=9	78%	16%	N=3	41%	12%
Average loan size per borrower in dollars	N=43	347	272	N=9	189	135	N=11	569, 5	358
<i>Financial structure</i>									
Loan to assets ratio	N=43	46%	15%	N=9	71%	19%	N=11	55%	11%
<i>Efficiency and productivity</i>									
Borrowers per staff member	N=43	524	352	N=9	288	279	N=11	351	245
Cost per borrowers in dollars	N=33	12	5	N=9	75	34	N=2	156	161
<i>Financial management</i>									
Interest yield	N=33	33%	20%	N=8	38%	14%	N=11	22%	6%
<i>Portfolio quality</i>									
PAR > 30 days	N=43	15%	19%	N=9	4%	6%	N=3	10%	8%
<i>Breath</i>									
Institution size in dollars (in 1000)	N=43	129,70	217	N=9	3.839	5.129	N=11	85.003	175.000

The average loan size also shows surprising outcomes. The mean and the median are larger for the SACCOs than the MFIs. The higher average loan can be an indication that the SACCOS lend more to the individual borrower. However, analyzing the PAR after 30 days, the higher loan size can be an indication that the SACCOs are operating more risky than the MFIs. The average loan size of the Commercial Banks is larger than the two other types of MFOs. This larger average loan size is not surprising because the Commercial Banks are characterised by focusing on larger loans. Thereby, as noticed in the introduction, Commercial Banks focus more on ‘economically active’ borrowers.

The focus on safer borrowers is presented by the lower interest yields which are charged compared to the two other types of institutions.

The efficiency and productivity variables show remarkable results. It seems that SACCOs have lower operating costs per borrower but have more borrowers per staff member than MFIs. However, even with the presence of low operating costs per borrower, SACCOs do

not have positive financial performances. This can be an indication that the interest yields charged by the SACCOs are too low to cover the operating costs.

Table 5 and 8, which can be found in appendix C, represents all the characteristics per institutional design and the total database. Section 4.3 will describe the variables which are used for this research.

Previous empirical research has used cross-country financial data to analyse the effect of outreach variables and the interest yield on the financial performance of MFOs. To my knowledge, this thesis is the first to analyse different institutional designs of MFOs within the same country. The financial data aids to find patterns between the average loan size variable and the interest yield variable on the financial performance.

Table 4
Overview of the descriptive data of the MFOs operating in rural or urban areas

Indicator	Rural			Urban		
	Obs.	Mean	Standard Deviation	Obs.	Mean	Standard Deviation
<i>Financial performance</i>						
Operational Self Sufficiency (OSS)	N=29	86,7	0,3	N=34	99	28,8
Return on Assets (ROA)	N=29	-2,4%	6,2%	N=34	-1,6%	9,9%
<i>Outreach</i>						
Borrowers (in 1000)	N=29	2,7	3,5	N=34	35,9	101
Percentage of women borrowers	N=26	29%	11%	N=29	65%	23%
Average loan size per borrower (\$)	N=29	335	242	N=34	388	330
<i>Efficiency and productivity</i>						
Borrowers per staff member	N=29	647	313	N=34	300	267
Cost per borrowers in dollars	N=26	14,3	18	N=19	52	62
<i>Financial management</i>						
Interest yield	N=29	33%	18,6%	N=23	29%	11%
<i>Portfolio quality</i>						
PAR > 30 days	N=34	33,7%	17,6%	N=29	7,6%	7,7%
<i>Breath</i>						
Institution size (in 1000)	N=40	445	878	N=34	28301	4128

Table 4 presents the difference of characteristics between MFOs operating in rural or urban areas, while table 5, which can be found in the appendix, shows the complete descriptive of the MFOs operating in rural or urban areas.

The disadvantage of serving rural borrowers is that the borrowers are often less educated and so may face difficulties in making proper risk analysis. Moreover, the large travel distances and therefore higher transportation and monitoring costs, creates lending more risky (Lafourcarde et al., 2005). In table 4, it can be seen that MFOs perform better in urban areas than in rural areas. Eyeballing the data, this can be the result of fewer

borrowers per staff member, which can be a sign for a better organized and managed institution. However, the higher number of staff members can also result in higher operating costs. The PAR after 30 days is much higher within rural areas. This may be explained by the large distances and the difficulties to monitor and control the borrowers. The largest MFOs in Tanzania are operating in urban areas. This can be a sign that economies of scale can be an indicator of better financial performance.

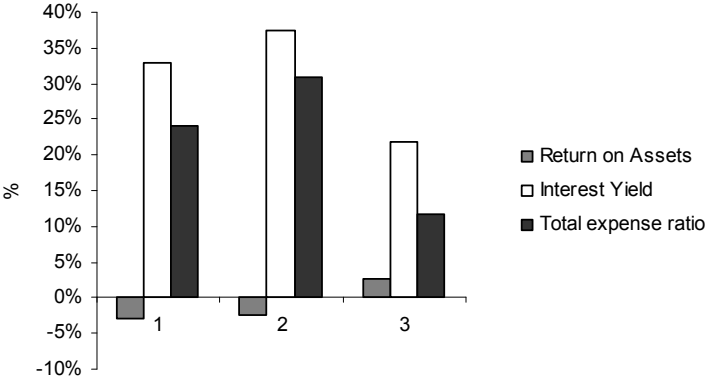


Fig. 2. Profitability, interest yield and the expenses for the different types of MFOs.
 1: SACCOS; 2: MFIs; 3: Commercial banks.

Figure 2 gives an overview of the relation of the financial performance, the interest yield and the total expenses relating the microfinance activities. The interest yield is determined in this research as the interest and fees charged by lenders divided by the total portfolio loan size. Moreover, the expense ratio is determined by the total expenses, including administrative costs and general costs, dividing the total assets. It can be seen that the Commercial Banks are the only MFO which achieve a positive financial result. This might indicate that larger loans can be positively related to a higher profitability. Moreover, the low total expense ratio can be interpreted as a measure for efficiency and economies of scale. A pattern emerges between the interest yield and the total expenses ratio. For all three MFOs, a higher total expense ratio results in a higher interest yield. Figure 2 show that MFIs and SACCOS have a higher total expense ratio than the commercial banks. The higher expense ratio may reflect the difference in focus of their social mission. Moreover, it can be explained by the higher average loan size, which results in less screening and monitoring expenses. This mission drift can result in a lower interest yield to cover the operating costs.

4.2 RESEARCH METHODOLOGY

The methodology used in my thesis is a linear regression model. Early empirical studies regarding the analysis of financial performance of MFIs also used benchmark regressions to explain the ability of being sustainable or not (Lafourcarde, 2005; Crombrugge et al., 2007; Cull et al., 2007).

The use of the regression model has different advantages (Crombrugge et al., 2007). First, it provides the possibility to analyse the effect of an independent variable on the performance indicators. By using the regression approach model it is possible to analyse the marginal effect of an independent variable while keeping the other independent variables constant. Due to the use of the regression approach model, the performance of individual MFOs can be analysed by holding other variables constant. With this possibility it can be analysed how far the performance lies from the regression line. Second, the effect of the independent variables can be analysed on their significance level. A statistical measure can be given for the effect of the independent variable on the performance indicator. Furthermore, the independent variables can be used to determine confidence intervals. Third, it is possible to use different types of performance indicators. The regression approach can be used to analyse the differences in the effect of the independent variables and the performance indicators.

The general form of the equation that is estimated is:

$$Y_i = b'X_i + u_i$$

Where Y_i is the dependent variable, X_i is the independent variable, b' is the regression coefficients, and u_i is the error term. The dependent variable represents the performance indicators, whereby the independent variables are divided in the explanatory variables and the control variables.

The explanatory variables are the average loan size and the interest yield variables. The other independent variables are the control variables which are described in section 4.3.

The objective of my thesis is to analyse the factors which have effect on the performance indicators. The performance indicators, which I use for three types of MFOs, are the Operational Self Sufficiency (OSS) and the Return on Assets (ROA). Furthermore, for

the analysis between the SACCOs and the MFIs, the Operational Cost per Borrower (OCB) and the Portfolio at Risk after 30 days (PAR) will be added as performance indicator.

The independent variables which I want to analyze are the average loan and the interest yield. The control variables which are added are variables borrowers per staff member, the loan to assets, the percentage of women and the institution size. Furthermore, dummy variables are also added to the analysis. The dummy variables are the region in which the MFO is operating (rural or urban) and the institution type (Commercial Bank, MFI or SACCO).

I will also determine the non linear relation for the explanatory variables. To determine the non linear relation, the coefficient of the interest yield and the squared form will be taken of each organisation separately. This non linear relation will also be measured for the average loan size per borrower. This will be done to find possible turning points, which may indicate maximum values for the relation between the independent variables and the dependent variables. The explicit equation which is used to model the non-linear relation between the yield and the financial performance is given by:

$$\text{If } Y_i = b_0 + b_1 * \text{Yield}_i + b_2 * \text{YieldSquared} + CX_i + u_i.$$

The fitted value of the variable that I use to depict the non-linear relation in a figure is determined by:

$$Y^{\text{fit}}_i = b_1 * \text{Yield}_i + b_2 * \text{YieldSquared}$$

This formula for the interest yield is used to construct the figures 3 and 5. In figure 4 and 6, the effect of the average loan size is given. The same formula is used but the coefficient of the single and the squared form of the average loan size are taken.

The method which I use for the regression analysis is the ordinary least squares (OLS). The OLS estimation represents a method of fitted data. The fitted data corresponds with the condition that the experimental errors faces a normal distribution. The OLS estimation requires that the model is linear in the parameters (α and β). With the OLS estimation method, a few assumptions are made. One assumption is that the error term has a constant variable. The constant variable means that the error term is considered to be drawn from

identical distributions. Because this research uses a relative small database which can be sensible for possible outliers, it can appear that the error term can differ with each observation.

Besides the OLS estimation, the Heteroskedasticity-Consistent Covariance (White) test will be used to improve the robustness of the dataset. Due to the presence of the unknown form (i.e. the cause) of the heteroskedasticity, the Heteroskedasticity-Consistent Covariance (White) test is used to improve the OLS estimates by making the standard errors of coefficients more conservative. The advantage of this method is that it corrects the estimated standard errors without changing the estimates of the parameters⁹. Testing for heteroskedasticity can be superior to the OLS estimation because false rejections of standard errors and assumptions or conclusion can be considered as misleading. Testing for heteroskedasticity is in line with previous research which includes cross-sectional data (Cull et al., 2007).

Another solution for dealing with the unknown form of heteroskedasticity can be including logarithm values. Including logarithm values can help to uncover scale effects. In my research the logarithm form of the total portfolio loan size has been taken. This has been done after testing for departures from normality. The normality of the total portfolio loan size is increased by taken the logarithm form as can be seen in appendix D.

The results which are analysed in my research can be divided between the non logarithm form of the portfolio loan size and the inclusion of the logarithm of the average portfolio loan size.

The tables with can be found in chapter 5 includes results which are based on the non logarithm form of the total portfolio loan size. However, to increase the robustness, extended tables are added in the appendix regarding the inclusion of the logarithm form of the total portfolio loan size and the determination of the results with the Heteroskedasticity-Consistent Covariance method.

Since I do not have data for each variable for each type of MFI, I constructed two tables with correlations. Table 7 indicates the variables which are used for the analysis of the

⁹ Chapter 3 of the book 'Introductory econometrics for finance' by Chris Brooks.

three types of MFOs, while table 8 represents the variables which are used for the comparison for the SACCOs and the MFIs. The tables can be found in the appendix.

Table 7 and 8 indicate a high positive correlation between the total number of borrowers and the total portfolio loan size. This is not surprising because both measure the size of the organisation. The inclusion of a highly correlated variable will result that coefficients of the variables will remain to be consistent and unbiased, but cause estimators to be inefficient. This means that the standards errors of the coefficients are inflated with the values in which the correlated variable would be excluded. This can result in insignificance of variables due to the presence of “irrelevant” variables. To circumvent this problem, the total number of borrower will be excluded in both parts of the financial analysis.

It can be seen that the percentage of women borrowers shows a correlation with the loan to assets ratio and the borrowers per staff. However, I consider the percentage of women borrowers as an important outreach dependent, so I have decided to include this variable in the analysis of the MFIs and the SACCOs. For the analysis of the three types of MFOs, the percentage of women borrowers will not be included due to the lack of availability.

4.2.1 THE DEPENDENT VARIABLES

This research uses in the first part of the financial analysis two different kinds of performance indicators namely the OSS and the ROA. The OSS considers the ability for an institution to generate enough revenue to cover the costs which are made. For extending my analysis, the return on assets will also be used as a dependent variable.

According to Pollinger et al. (2007) must the sustainability be measured by the OSS because it measures the way of covering the costs including donors and subsidies. The average OSS of the total group is 93,40% while the average ROA is -2,03%. It can be concluded regarding these results that the MFOs are on average not sustainable. An OSS of above 100 % means that the organisation can cover their costs. Moreover, the ROA is negative. According to Lafourcade et al. (2005), this can be explained by the high operating costs which they discovered for MFIs in Africa.

Christen (2000) suggest that besides the OSS and the ROA, the OCB and the PAR can be used to determine financial performance. In this research these two performance indicators will be used for the analysis of the SACCOs and the MFIs.

In my research, the operating costs are determined by a ratio, namely the operating costs per borrower. Operating costs differ from the total costs for a MFO. Regarding Ledgerwood (1998), operating costs are total costs excluding borrowers' funds and loan loss reserves. As can be seen in table 4, the costs differ extremely among the different types. The results may indicate that high operating costs per borrowers are related with the size of the institution.

The PAR after 30 days is also used as a financial performance indicator. I have chosen to take 30 days after the original repayment date to exclude short term delinquencies which can always occur by repayments. Table 2 shows that the PAR after 30 days is higher for the SACCOs (15%) than the MFIs (4%). The PAR after 30 days of the SACCO is much higher than the average delinquency rate (5%) which was found as the average delinquency rate in the research of Nair (2005). The PAR after 30 days can be seen as a performance indicator because a higher PAR can result in higher financial costs and finally may lead to repayment defaults. The financial costs may have an effect on the profitability of a MFO. Repayment rates can be increased through better innovative contracts and strict lending conditions.

4.2.2 THE INDEPENDENT VARIABLES.

The independent variables are based on the framework of Schreiner (2002). He developed the framework to explain the social benefits and the outreach of MFOs. Schreiner divide the framework into five different aspects namely costs, depth, breath, length and scope. The costs are formed by the transaction costs and the price costs. Depth can be measured by the percentage of women borrowers. Breath is the total number of clients which are served. Length is the total time period relating to the supply of financial services. Scope reflects the different kinds of financial contracts that are provided. These five aspects can be used to make a comparison between different MFOs.

This research analyses the MFOs at their efficiency (operating costs per borrower), productivity (the borrowers per staff member), depth (percentage of women borrowers and the average loan size) and breath (institution size). Moreover, the effect of the interest yield on the financial performance indicators is examined. The financial structure which is given by the loan to assets ratio will also be included as an independent variable. The outreach is explained by the depth variables. As mentioned in section 5.1, the independent variables are split up in the explanatory variables and the control variables.

The explanatory variables are the interest yield variable and the average loan size.

Interest Yield

The interest yield is determined by the interest and fees charged by lenders divided by the total portfolio loan size. According to Stiglitz and Weiss (1981), raising interest will have an effect on the quality of the portfolio and thereby creates adverse selection and moral hazard problems. The relation between the interest yield and the profitability is positive. However, mentioned by Cull (2007), the interest yield generates a hump-shaped form for profitability, that is, profits increase with the interest yield until a certain point. Because certain levels of interest yields are not affordable for poor borrowers, outreach levels will not be expanded. Therefore, the height of the interest yield can result in impossibility of lending for this group of borrowers, and will have negative financial consequences. Due to the presence of especially bad borrowers, negative financial consequences occur through decreasing repayment rates. In my research, the quadratic term of the interest yield will also be used to test if optimum values of the interest yield can be found.

An inverse U-shaped pattern can be an indication for agency problems. These problems can occur in case the high interest yields will result in a decreasing demand of the good borrowers. As mentioned by Rhyne (1998), it is the challenge to charge an interest yield, which covers the costs and can be afforded by poor clients. In case this can not be developed, subsidies are needed to finance the services. However, she emphasize that although MFOs uses subsidies, they have to remain developing methods in which they work efficiently.

Average loan size

The average loan size per borrower shows the depth of outreach. The lower the average loan size, the higher the outreach level. The average loan size for SACCOs is 347 dollar,

MFI 135 dollar and for the commercial banks 570 dollar. Higher average loan sizes can be provided when borrowers are considered to be safe borrowers after monitoring them. The use of collateral can be a certain form of security. Client binding can also assure more certainty, because the MFO knows the clients for a longer time. Commercial banks in Tanzania used the strategy of starting with relative low amounts of loan but increase the loan size after a good repayment history. The average loan size is mainly dependent on the staff members which have to monitor the borrowers. In case of a high default risk, they will decide not provide the loan due to the possibility of low repayment rates.

The control variables which I use in my research are based on the framework of Schreiner. The dummy variables are added to analyse if the region in which MFOs are operating matters. Furthermore, in comparison with Cull et al. (2007), I will analyse if the focus on individual or group lending has an effect on the financial performance indicators. In my research this will be done by taking the different microfinance organisation types as dummy variables.

Productivity

The borrowers per staff member can show the intensity at which the monitoring and the business processing takes place. However, inefficiencies can occur which are mentioned earlier in my research. Monitoring is a very important aspect within providing microfinance loans. The estimation of the risks can result in a lower PAR after 30 days. As can be seen in table 4, the SACCO has the most borrowers per staff, but also has the highest PAR. In this research I try to find out if a high number of borrowers per staff member will contribute to a higher financial performance.

Breadth

The total portfolio loan size of the institution can also have an effect on performance. The total portfolio loan size can result in a higher efficiency due to higher economies of scale and so cost efficiencies. This research will find out if differences in institution size matter.

Outreach

Besides the average loan size is also the percentage of woman borrowers an indicator of the outreach level. Research has shown that women borrowers play an important role in

microfinance (Leach and Sitaram, 2000). They mentioned that women borrowers commonly are considered to be the poorest within society. Furthermore, in development countries they are discriminated on the formal labour market and are therefore forced to run small private companies. Moreover, microfinance and so providing loans to women borrowers can be lead to a different household structure where the woman has more to say. A common accepted view is that women borrowers are considered to be saver borrowers than men and so have better repayment rates. In case of crisis, women are mentioned to be more vulnerable. According to these results it can be assumed that a higher percentage of women borrowers can mean that the profitability will increase.

The financial structure

The total loan size to total assets ratio is a measure for the financial structure of the MFO. It is an indication for which the total portfolio loan size is part of the total assets. As can be seen in table 4, are the differences are not large between the three types of MFO. MFIs are characterised by the fact that 70% of the total assets are loans which are provided. For commercial banks this percentage is 55%, which can be a sign that savings for example, are also the main business.

Dummy variables

In my research, there are two dummy variables included. The first dummy variable consider if the type of the MFO do matters. The second dummy is the region dummy. In my research are 54% of the MFOs located in rural areas. Rural areas are considered to be more difficult to operate because the infrastructure is undeveloped and so transportation costs will lower the profitability. However, as mentioned by Sharma and Zeller (1997), rural areas are considered to have fewer providers of loans, and so a good repayment history will enlarge the chance of new future loans for borrowers.

The variable definitions can be found in appendix B.

CHAPTER 5: EMPIRICAL RESULTS AND FINDINGS

This chapter makes a distinction between the results of the three different types of MFOs and the results for the SACCOs and the MFIs. This distinction is made because more data was available for the SACCOs and the MFIs. Furthermore, the insertion of the extra control variable will contribute to a better analysis of the variables which have an influence on the financial performance variables.

5.1 RESULTS OF ALL THE THREE TYPES OF INSTITUTIONS

Table 9
Financial performance regressions for all the three different types of organisations, allowing non linear for the interest yield and the average loan size

	OSS (1)	ROA (1)		OSS (1)	ROA (1)
Interest Yield	2,136 [2,088]**	0,100 [0,284]	Interest Yield	0,374 [1,224]	0,062 [0,603]
Interest Yield Squared	-2,193 [-1,872]*	-0,048 [-0,119]	Average Loan size per borrower	0,001 [1,727]*	0,000 [0,518]
Average Loan size per borrower	0,000 [2,482]**	0,000 [1,485]	Average Loan size per borrower squared	0,000 [-1,018]	0,000 [-0,074]
Borrowers per staff member	0,000 [1,917]*	0,000 [1,775]*	Borrowers per staff member	0,000 [2,107]**	0,000 [1,725]*
Loan to assets ratio	0,212 [0,652]	0,007 [0,059]	Loan to assets ratio	0,170 [0,508]	0,006 [0,051]
Total portfolio loan size (\$)	0,000 [-0,834]	0,000 [-0,119]	Total portfolio loan size (\$)	0,000 [-0,845]	0,000 [-0,121]
Urban	0,040 [0,444]	-0,004 [-0,126]	Urban	0,034 [0,360]	-0,004 [-0,130]
Sacco	-0,049 [-0,179]	-0,164 [-1,725]*	Sacco	0,091 [0,324]	-0,161 [-1,713]*
MFI	0,238 [0,707]	-0,101 [-0,871]	MFI	0,482 [1,579]	-0,096 [-0,937]
Commercial Banks	0,388 [1,377]	-0,071 [-0,733]	Commercial Banks	0,535 [1,897]	-0,068 [-0,724]
Observations	63	63	Observations	63	63
Adjusted R- Squared	0,257	0,089	Adjusted R- Squared	0,269	0,032

* significant at 10%, ** significant at 5%, *** significant at 1 %. t-stats in brackets
(1) OLS estimation.

Table 9 gives an overview of the results for the different types of MFOs. It illustrates that an increasing interest yield has a positive significant effect on the OSS of a MFO. An insignificant positive relationship can be observed for the ROA. It is surprising that there is a large difference between the relationship between the interest yield and the OSS and the ROA. As can be seen in figure 3, the height of the interest yield does increase the OSS. Figure 3 suggests that a maximum interest yield of 52% can be charged without harming the OSS.

The turning point of 52% for the interest yield is almost twice as high as the mean interest yield for the whole dataset. The relative low average interest yield of the dataset may indicate that an increasing interest yield improves the financial performance till 52%, but the profitability will be harmed after the turning point. This may suggest that till the turning point, higher costs are not related to a decreasing quality of the portfolio. As can be seen in table 21 and 22, an increasing interest yield will result in a higher PAR, and so have a direct effect at the quality of the portfolio.

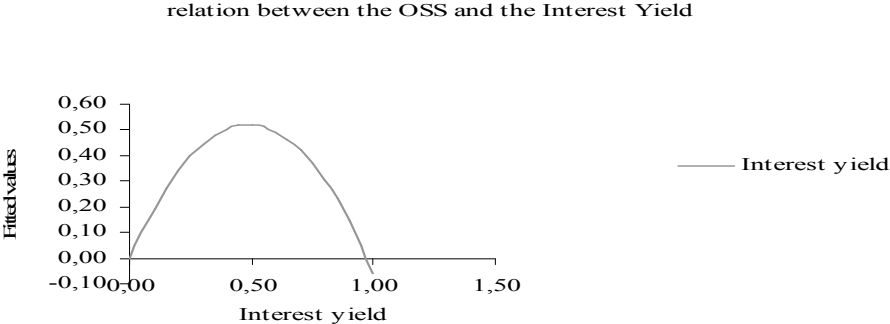


Fig. 3, Relation between the Operational Self Sufficiency and the Interest yield for MFOs. OSS is from table 9 column 1.

Literature about the adverse selection problem explains the pattern shown in figure 3. An interest yield which is considered by borrowers as too high, can lead that safe borrowers do not want to lend money and cannot afford to pay the high interest yields. The decreased demand of low risk borrowers can cause that loans are only provided to borrowers who are willing to take risks and may face volatile sources of income. The presence of risky borrowers can have a direct effect on the quality of the portfolio. It should be kept in mind that the values of the turning points are illustrative.

Crombrugge et al. (2007) observed that the interest yield also had an inversed U-shaped correlation with the FSS. After the turning point of 55% interest yield, the increasing interest yield will result in a decreasing financial performance. This is in line with my research. Cull et. al. (2007) also observed an increasing profitability until a certain threshold. This assumes that the borrowers can not afford to take the loan without getting into financial difficulties. These results are contrary to the ‘win-win’ situation which is mentioned by Morduch (2000) and indicates that an increasing interest yield will not decrease the level of outreach. H_0 can not be rejected due to the contraction with the ‘win-win’ situation as shown in figure 3.

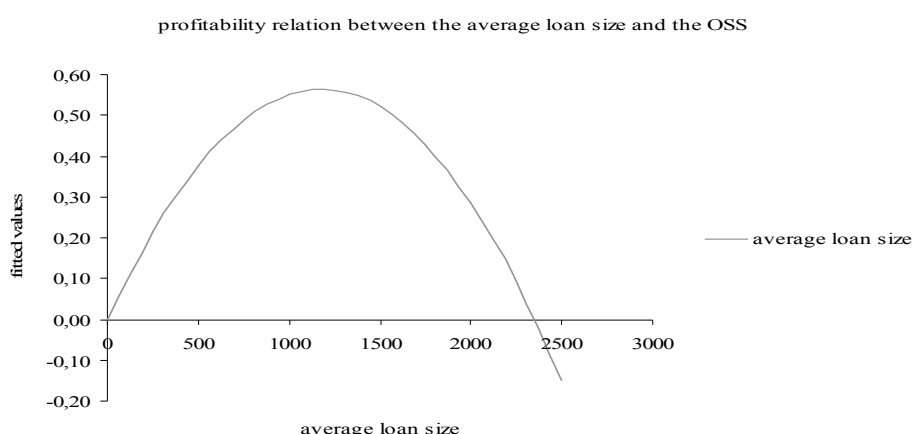


Fig. 4, *Financial performance and the average loan size.* OSS is from table 9 column 3.

In table 9 can be seen that the average loan size has a significant positive effect on the OSS. There is an insignificant relation between the average loan size and the ROA. The relation between the OSS and the average loan size might indicate that increasing of the average loan size does contribute to a higher profit. However, as can be seen in figure 4, the OSS will be harmed at an average loan size of 1150 dollar and will be negative when the average loan size is above 2325 dollar. Figure 4 show that 1150 dollar is the optimal average loan size amount. This is remarkable during the fact that higher average loans are considered to be more secure loans. However, the reverse U-shaped form is in line with the research of Crombrugge et al. (2007). They mention that organisations do not have to provide very small loans or large loans but a loan of 120 dollar is considered to be optimal. In table 8 it can be noticed that average loan size of the total dataset is 364 dollar. It can be noticed that there is a difference between the mean of the total sample and the illustrative turning point which is given in figure 4. Furthermore, due to the insignificant relation between the average loan size squared and the OSS, the illustrative turning point can be considered as suggestive. To increase the financial performances, the MFIs can increase their average loan size. Due to the positive significance influence of the average loan size on the OSS, H_0 can not be rejected.

The control variable; the borrowers per staff member, shows a marginal significant positive effect on the OSS and the ROA. This result is remarkable because the MFIs and the Commercial Banks do have on average lower borrowers per staff member than the SACCOs. This might indicate that more borrowers per staff member will result in a better

financial performance. Crombrugge et al. (2007) mentioned that fewer borrowers per staff member may lead to a better focus in education, monitoring and screening.

The positive significant result suggests that the increase of the productivity variable might lead to a higher profitability. The other control variables show an insignificant positive effect on the financial performance variables. However, the region dummy indicates that financial health, in the form of the ROA, may be reached in urban areas.

Table 10 shows the results by using the Heteroskedasticity-Consistent Covariance method. The results are in line with the results shown in table 9. However, marginal significant relations are found for the institution size. Table 11 and 12 shows the financial results including the log of the total portfolio loan size. The insignificant results for the interest yield and the average loan size are contrary to the research of Cull et. al (2007) and Crombrugge et. al (2007). This may indicate that figure 3 and 4 can be illustrative and a suggestive representative of the relation between the OSS and the explanatory variables.

5.2 RESULTS OF ALL THE THREE TYPES OF INSTITUTIONS WITH INTEREST YIELD INTERACTIONS.

This section reveals the effect of the interest yield regarding the adverse selection and the moral hazard problem. MFOs face adverse selection problems when they charge high interest yields. High interest yields can result in a lower demand and increasing repayment difficulties, which might lead to a decreasing profitability. This section will analyse the effect of the interest yield for the three different types of MFOs.

The results in table 13 are in line with the theoretical predictions. The interest yield of the SACCOs is significant positive linked to the OSS, but the MFI is significant negative linked to the OSS. The interest yield of the Commercial banks is insignificant positive linked to the OSS. However, including the log of the total portfolio loan size, there appears to be a significant positive link for the Commercial Banks. These results are in line with the results of Cull et al. (2007), which founds that for group lenders also a negative relationship exists and a positive significant relation for the individual lenders was found. Crombrugge et al. (2007) found a positive significant relation between group

loan providers and the financial performance. This is in line with my results for the SACCOs and the Commercial Banks.

Table 13
*Financial performance regressions for all the three different types of organisations,
allowing non linear for the interest yield*

	OSS (1)	OSS (2)	ROA (1)	ROA (2)
Interest Yield * SACCO	3,365 [3,298]***	3,365 [3,626]***	0,427 [1,137]	0,427 [1,989]*
Interest Yield * MFI	-8,011 [-2,129]**	-8,011 [-1,871]*	-2,594 [-1,875]*	-2,594 [-1,752]*
Interest Yield * Commercial Banks	0,192 [0,014]	0,192 [0,0297]	0,320 [0,066]	0,320 [0,138]
Interest Yield Squared * SACCO	-3,210 [-2,813]***	-3,210 [-3,433]***	-0,311 [1,592]	-0,311 [-1,345]
Interest Yield Squared * MFI	8,214 [1,800]*	8,214 [1,813]*	2,671 [-0,039]	2,671 [1,614]
Interest Yield Squared * Commercial Banks	2,170 [0,077]	2,170 [0,159]	-0,405 [-0,039]	-0,405 [-0,084]
Average Loan size per borrower	0,000 [2,437]**	0,000 [2,455]**	0,000 [1,286]	0,000 [1,760]*
Borrowers per staff member	0,000 [1,951]*	0,000 [2,096]**	0,000 [1,707]*	0,000 [2,120]**
Loan to Assets ratio	0,540 [1,748]*	0,540 [1,864]*	0,101 [0,887]	0,101 [1,056]
Total portfolio loan size	0,000 [-0,667]	0,000 [-1,326]	0,000 [0,0559]	0,000 [0,103]
Urban	-0,010 [-0,119]	-0,010 [-0,106]	-0,017 [-0,560]	-0,017 [-0,490]
SACCO	-0,422 [-1,588]	-0,422 [-1,583]	-0,266 [-2,725]***	-0,266 [-3,817]***
MFI	2,211 [3,086]***	2,211 [2,311]**	0,426 [1,615]	0,426 [1,386]
Commercial Banks	0,458 [0,302]	0,458 [0,613]	-0,141 [-0,253]	-0,141 [-0,518]
Observations	63	63	63	63
Adjusted R-Squared	0,452	0,452	0,124	0,124

* significant at 10%, ** significant at 5%, *** significant at 1 %. t-stats in brackets
(1) OLS estimation. (2) White Heteroskedasticity Consistent Standard Errors & Covariance.

The relationship between the interest yield and the OSS of the MFIs is a U-shaped curve, as can be seen in figure 5. Hypothesis H_0^* can be rejected till the interest yield of 40%. After the turning point, the financial performance will be improved after increasing the interest yield.

Hypothesis H_0^* can be rejected after the turning point of the interest yield for the SACCOs and the Commercial Banks. The turning points of the two types are completely different. As can be seen can the interest yield be increased 25 % for Commercial Banks before harming the financial performance, while for the SACCOs this happens at an

interest yield of 60%. For the commercial banks must be mentioned, that the relation between the interest yield squared and the OSS is not significant. Therefore, the illustrative turning point can be considered as suggestive.

For the SACCOs, the interest yield can be increased to 60% without harming the financial performance, while for the Commercial banks this happens by an interest yield of 25%. The suggestive turning point in table 3 is remarkable for the Commercial Banks during the fact that the mean interest yield of the data set is 22%. This may indicate that Commercial Banks do charge the optimal interest yield.

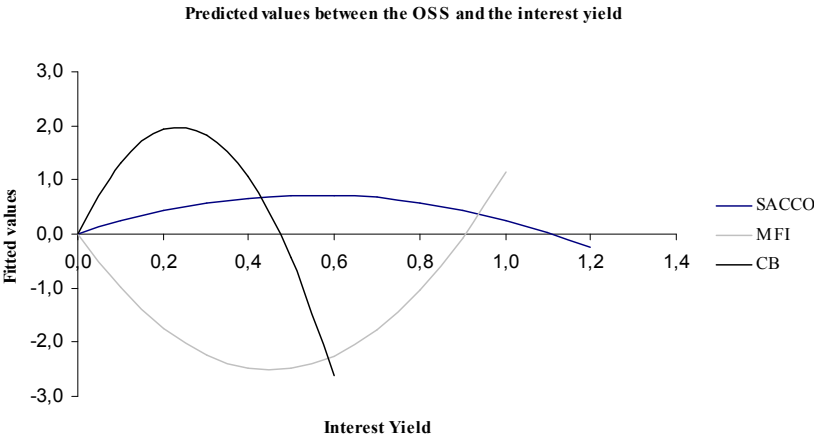


Fig. 5, Operational Self Sufficiency and the Interest yield for the different types of MFOs. OSS is from table 14 column 1. In contrary with figure 3 and 4 is the data taken from the results including the log function of the total portfolio loan size.

Overall, the results in table 13 and 14 and figure 5 show some interesting results. Till an interest yield of 42%, the Commercial Banks are more profitable than the other two MFO types. This might indicate that Commercial banks offer loans to saver borrowers, and are capable to charge lower interest yields to be profitable. Figure 5 also shows that the profitability decreases for Commercial Banks when interest yield above 25% are charged. This might implicate that agency problems occur and that borrowers with unsecured projects are provided by loans. This can increase the chance of default. SACCOs and MFIs are mostly serving borrowers which are excluded from loans of the Commercial Banks. This group are mostly served by group lending methods and due to the riskiness of the borrowers, are charged by a higher interest yield. Figure 5 denote that SACCOs are the most profitable between an interest yield between 0% and 60% percent. For the interest yield of the MFI the positive influence exist from an interest yield of 90%. This is

a remarkable result, because this might signalize that the interest yield is not the lead variable for the financial performance of an MFI.

Besides the interest yield, there are also control variables significantly linked to the OSS and the ROA.

The borrowers per staff member and the institution size do have a significant and positive relationship with the OSS and the ROA. This declares that productivity and economies of scale contribute to the financial performance.

The borrowers per staff can be increased for the MFI because this is particularly low. The significant positive effect of the total number of borrowers is in line with the research of Nair (2005), which also showed that economies of scale take place. The economies of scale and the professionalized way of operating contribute to financial health of the MFIs. This is confirmed by the MFI as dummy variables, which shows a positive relationship with the OSS. The financial results including the log of the total portfolio loan size do show the same relations.

5.3 RESULTS OF THE SACCOS AND THE MFIS

This section represents the differences in financial performance between the SACCO and the MFI. The analysis of the SACCOs and the MFIs has been done more extended due to the availability of the financial data. This result, as mentioned before, that also the PAR after 30 days and the Operating Cost per Borrower are included as financial performance indicators. The contribution of the analysis of the PAR is related to the quality of the loan portfolio. A higher PAR indicates that the borrower has difficulties with repaying the loans and the paying of the interest. The operating cost per borrower can be considered as an indicator for the efficiency. Lafourcarde et al. (2005) emphasize that micro finance activities are expanding in African countries during the last years. They mentioned that Africa is a productive environment, with a high number of clients per staff member and a low PAR of only 4% on average. However, there still remain some challenges for Africa. The operating and financial expenses remain to be high in comparison with other regions in the world.

The percentage of women is also added as control variable. The role of the percentage of women borrowers is interesting in two ways. First, women are considered to be poorer

than men in developed countries, which represent a sign for poverty. Second, they are mentioned to be better borrowers than men due to better repayment incentives.

Table 15 shows the influence of the interest yield on the OSS and the ROA. The positive significant influence of the interest yield on the OSS represents that a higher interest yield do not lead to a decreasing quality of the portfolio.

Differences can be found in the role of the average loan size. The average loan size is positively related to the OSS and the ROA but is insignificant. The insignificance shows that there is no evidence for any concrete relation between the average loan size and the financial performances.

The coefficient of the women borrowers signals that there is a relationship between the percentage of women borrowers and the financial performance. This might indicate that the outreach can be expanded without harming the financial performance.

Table 15

Financial performance regression for the SACCOs and MFIs, allowing non linear effects of the interest yield and the average loan size per type of MFO

	OSS (1)	ROA (1)		OSS (1)	ROA (1)
Interest Yield	2,539 [2,219]**	0,157 [0,373]	Interest Yield	0,419 [1,218]	0,093 [0,773]
Interest Yield Squared	-2,566 [-1,99]*	-0,093 [-0,195]	Average Loan size per borrower	0,001 [1,104]	0,000 [0,757]
Average Loan size per borrower	0,000 [1,768]*	0,000 [1,389]	Average Loan size per borrower Squared	0,000 [-0,640]	0,000 [-0,368]
Borrowers per staff member	0,000 [2,154]**	0,000 [1,606]	Borrowers per staff member	0,000 [2,271]**	0,000 [1,669]
Loan to Assets ratio	0,184 [0,517]	-0,018 [-0,137]	Loan to Assets ratio	0,152 [0,402]	-0,023 [-0,177]
Total portfolio loansize	0,000 [0,767]	0,000 [0,970]	Total portfolio loansize	0,000 [0,943]	0,000 [1,018]
Percentage of women borrowers	1,233 [2,480]**	0,193 [1,055]	Percentage of women borrowers	1,070 [2,022]*	0,178 [0,966]
Urban	-0,116 [-0,998]	-0,041 [-0,950]	Urban	-0,099 [-0,802]	-0,042 [-0,973]
MFI	-0,235 [-0,877]	-0,021 [-0,214]	MFI	-0,090 [-0,295]	-0,004 [-0,034]
Constant	-0,481 [-1,444]	-0,228 [-1,856]*	Constant	-0,214 [-0,630]	-0,237 [-2,008]*
Observations	52	52	Observations	52	52
Adjusted R- Squared	0,265	0,097	Adjusted R- Squared	0,215	-0,033

* significant at 10%, ** significant at 5%, *** significant at 1 %. t-stats in brackets
(1) OLS estimation

The results of the operating cost per borrower in table 19, mention the significant and negative relationship with the borrower per staff member. The borrower per staff member

is an important indicator because staff member are responsible for monitoring, selecting and educating the borrowers. Similar with the results in section 5.1, it can be mentioned that increasing the borrowers per staff member contribute to a better financial performance. Represented in table 19, an increasing number of borrowers per staff member will lower the costs per borrower, and so the efficiency will be improved.

The total portfolio loan size is insignificant related to the operating cost per borrower. This is contrary with Crombrugge et al. (2007) which show that an increase in organisation size results in a decrease of the costs. My research also finds a positive significant relation between MFIs and the operating costs per borrower.

This may signal at an inefficient way of working process within MFIs. The urban variable shows that urban microfinance organisation are positive related to the costs, while operating in rural areas will results in lower operating costs. This is in contrary with the results of Lafourcarde et al. (2005), which found that higher operating costs occur in rural areas due to large distances and difficulties in monitoring.

Table 19

Financial performance regression for the SACCOs and MFIs, allowing non linear effects of the interest yield and the average loan size per type of MFO

	Log OCB (1)	Log OCB (2)		Log OCB (1)	Log OCB (2)
Interest yield	2,413	2,413	Interest yield	0,805	0,805
	[1,615]	[2,078]**		[1,855]*	[1,664]
Interest yield squared	-1,939	-1,939	Average loan size per borrower	0,001	0,001
	[-1,151]	[-1,466]		[0,695]	[0,701]
Average loan size per borrower	0,000	0,000	Average loan size per borrower squared	0,000	0,000
	[1,295]	[1,864]*		[-0,337]	[-0,369]
Borrowers per staff member	-0,001	-0,001	Borrowers per staff member	-0,001	-0,001
	[-4,123]***	[-4,212]***		[-3,812]***	[-4,150]***
Total loan to assets ratio	0,738	0,738	Total loan to assets ratio	0,716	0,716
	[1,585]	[1,450]		[1,501]	[1,426]
Total portfolio loan size	0,000	0,000	Total portfolio loan size	0,000	0,000
	[-1,120]	[-1,169]		[-0,974]	[-1,053]
Women	-0,689	-0,689	Women	-0,807	-0,807
	[-1,060]	[-0,769]		[-1,209]	[-0,842]
Urban	0,292	0,292	Urban	0,306	0,306
	[1,917]*	[2,354]**		[1,971]*	[2,265]**
MFI	1,563	1,563	MFI	1,667	1,667
	[4,461]***	[4,227]***		[4,347]***	[3,909]***
Constant	2,095	2,095	Constant	2,308	2,308
	[4,812]***	[6,640]***		[5,398]***	[5,504]***
Observations	52	52	Observations	52	52
Adjusted R-Squared	0,867	0,867	Adjusted R-Squared	0,822	0,862

* significant at 10%, ** significant at 5%, *** significant at 1 %. t-stats in brackets
(1) OLS estimation. (2) White Heteroskedasticity Consistent Standard Errors & Covariance.

Analyzing the PAR after 30 days, it can be seen in table 21 and 22 that deterioration of the portfolio can take place in case of a higher interest. However the relation is insignificant. Therefore, it can not be concluded if agency problems occur in case of a higher interest yield. However, the results in table 21 and 22 (column 3 and 4) shows a positive significant relation between the PAR after 30 days and the interest yield.

The positive relation between the PAR after 30 days and the interest yield is in line with Ahlen and Townsend (2007).

The role of the average loan size and the PAR after 30 days can be seen in figure 6. The negative significant relation indicates that increasing the average loan size will improve the quality of the portfolio.

However, in case the average loan has a value of above 1750 dollar, the PAR after 30 days increases. This indicates that a high average loan do not have to result in a higher qualitative portfolio. The significant negative relation can be considered as remarkable since the research of Cull et al. (2007) and Crombrugge et al. (2007) both found insignificant positive relations.

Table 21

Financial performance regression for the SACCOs and MFIs, allowing non linear effects of the interest yield and the average loan size per type of MFO

	PAR (1)	PAR (2)		PAR (1)	PAR (2)
Interest Yield	0,177 [0,261]	0,000 [0,266]	Interest Yield	0,583 [3,122]***	0,583 [3,444]***
Interest Yield squared	0,595 [0,780]	0,177 [0,712]	Average Loan size per borrower	-0,001 [-1,972]*	-0,001 [-1,862]*
Average Loan size per borrower	0,000 [-1,297]	0,595 [-1716]*	Average Loan size per borrower squared	0,000 [1,652]	0,000 [1,733]*
Borrowers per staff member	0,000 [0,158]	0,000 [0,192]	Borrowers per staff member	0,000 [-0,246]	0,000 [-0,300]
Loan to assets ratio	0,180 [0,853]	0,000 [0,940]	Loan to assets ratio	0,217 [1,055]	0,217 [1,131]
Total loan size	0,000 [-0,404]	0,180 [-0,709]	Total loan size	0,000 [-0,618]	0,000 [-1,147]
Women	-0,072 [-0,246]	0,000 [-0,322]	Women	0,032 [0,109]	0,032 [0,135]
Urban	0,033 [0,474]	-0,072 [0,649]	Urban	0,040 [0,599]	0,040 [0,811]
MFI	-0,182 [-1,144]	0,033 [-1,472]	MFI	-0,303 [-1,835]*	-0,303 [-2,040]*
Constant	0,023 [0,116]	-0,182 [0,157]	Constant	0,095 [0,518]	0,095 [0,588]
Observations	41	41	Observations	41	41
Adjusted R-Squared	0,348	0,348	Adjusted R-Squared	0,389	0,389

* significant at 10%, ** significant at 5%, *** significant at 1 %. t-stats in brackets

(1) OLS estimation. (2) White Heteroskedasticity Consistent Standard Errors & Covariance.

For all the control variables has an insignificant relation with the PAR after 30 days been found. For the PAR, H_0 can not be rejected because the relationship shows that lowering the average loan size per borrower is negative related with the quality for the portfolio.

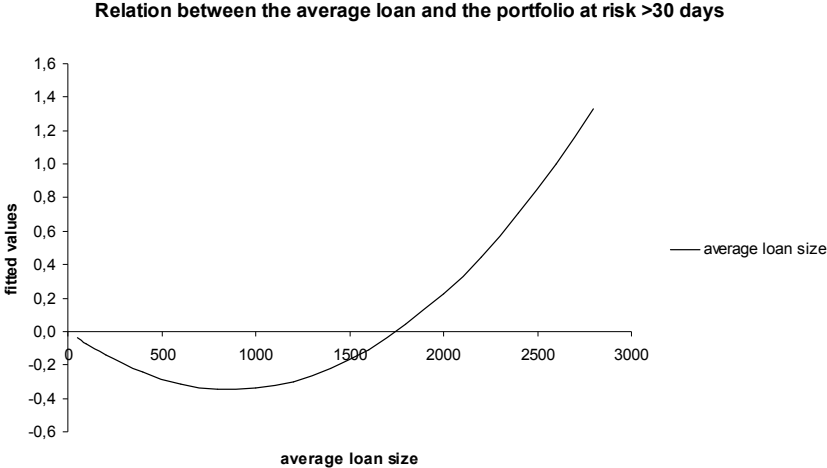


Fig. 5, Portfolio at risk and the average loan size for the SACCOs and the MFIs. PAR after 30 days is from table 21 column 4.

The research of Crombrugge et al. (2005) showed that the role of the women do not play a significant role, but they assume that focusing on women borrowers do not harm the profitability of the MFI either. These results are in contrary with the influence of the percentage of women borrowers and the OSS and the ROA found in my research. As can be seen in table 15 and 17, a significant positive relationship can be measured. This might indicate that women borrowers are better borrowers. Furthermore, it can be considered as a sign for poverty as mentioned in section 3.

Besides the positive relation between the percentage of women borrowers and the financial performance is the influence of women borrowers on the cost per borrower negative, which may indicate that borrowing to women borrowers will lower the operating costs. This negative influence has also been found for the PAR after 30 days. However, due to the insignificance of the coefficients, H_1 can not be accepted. In sum, the influence of the women borrowers does not harm the financial performance and do not decrease the quality of the portfolio. However, this suggestive relation is based on an insignificant relation.

The region dummy shows that rural areas can be contributable to a better PAR after 30 days and a lower operating cost per borrower. This is in line with Wenner (1995) and Sharma and Zeller (1997), which argued that through the lack of financial services, people must be reliable borrowers and have high repayment incentive to ensure themselves to get loans in the future.

The relation with between the urban dummy and the cost per borrowers is surprising due to the high transaction and transaction costs which are related with providing loans in rural areas.

CHAPTER 6: CONCLUSION

6.1 CONCLUSION

According to the literature, I expected that the interest yield would have a positive effect on the financial performance of a MFO till a certain maximum point. Further, previous research found an insignificant trade off between the financial performance and serving to the poorest people. This trade off do not provide evidence that serving the low income household necessary lead to a decreased financial performance. An insignificant relation was also found between the average loan size and the repayments of the loans. More, MFOs can increase their financial performance by increasing the number of borrowers per staff member. This means that productivity can be increased to improve the profitability. Finally, the role of women borrowers is investigated. It is found that women borrowers do not significant improve the financial performances, but at least they will not harm the profitability.

In my research I have tried to address two questions. The first question is regarding the possibility if a lower average loan size improves the financial performance. The second question measures if a higher interest yield improve the financial performance. The financial performance have been tested for all the three types of MFOs by analysing the OSS and the ROA, while for the expanded analysis of the SACCOs and MFIs, the OCB and the PAR after 30 days were also included.

On my first question, regarding the relation between the average loan size and the financial performance indicators, two different signals have been found. The marginal significant relationship between the OSS and the average loan size shows that till an average loan size of 1150 dollar, there is a positive relationship, while after this turning point, the relationship is becoming negative. This may indicate that only increasing the loan size do not necessary contribute to better performances. However, as mentioned in chapter 5, the relation between the average loan size squared and the OSS is insignificant. Therefore, the turning point is suggestive. The insignificant relation between the OCB and the average loan size do not confirm that higher average loans harm the financial performance. The analysis regarding the PAR after 30 days shows remarkable results. It shows that an average loan size of above 1000 dollar does lead to a decrease in quality of

the portfolio. This confirms the results that increasing the average loan size can harm the financial performance of a MFO.

My second question was regarding the role of the interest yield on the financial performances. I have found that SACCOs and the Commercial Banks may improve their financial performances by increasing the interest yield. The turning points which can be found in figure 5, indicates that increasing the interest yield can harm the financial performance. This might signals that agency problems occur when high interest yields are charged and lead to a decreasing demand for credit. For the MFIs is a highly negative significant relation found between the interest yield and the financial performance. The insignificant relation which is found between the interest yield and the Operating Cost per Borrower and the PAR after 30 days do not confirm the question that increasing the interest yield lead to a decreasing financial performance.

Analyzing for other relevant aspects related to the financial performance of the MFOs showed that the total portfolio loan size do have a significant positive relationship with the financial performance. This might be an indication that economies of scale may exists. The financial performances may also be increased when the borrowers per staff member will be expanded. In line with the significant negative relation found by Crombrugge et al. (2007), an increase of the borrowers per staff can decrease the operating costs. More, the Operating Cost per Borrower is significant positive related with the urban region. This might indicate that MFOs operation in urban areas will faces higher costs than MFOs focusing on rural areas. In line with the research of Crombrugge et al. (2007), it is showed that despite the insignificant relation between the percentage of women borrowers and the OCB and the PAR after 30 days, borrowing to women do not harm the financial performance. However, a marginal positive significant relation is found between the percentage of women borrowers and the OSS. The significant relation can be considered as remarkable due to the insignificant relation who has been found in previous research.

On the whole, the relation between the average loan size and the interest yield on the financial performances shows remarkable results. The ‘win-win’ situation of microfinance mentioned by Rhyne (1998), seems not to occur for the MFOs in Tanzania.

The absence of the 'win-win' situation can be noticed by the fact that a decreasing average loan size do not contribute to a higher profitability.

Moreover, my research has showed that increasing the interest yield does improve the financial performance, but this improvement only occurs till a certain turning point.

The financial results which are shown in this research leave enough space to investigate some interesting aspects about microfinance. Future research which really wants to analyse the 'win-win' situation can analyse lending programs which are exclusively focusing on the lowest income households. If these programs can be innovated in a way that they can cover there costs, it can be concluded that a 'win-win' situation can be accomplished. It would be interesting to analyse different microfinance methods used by MFOs. This would be interesting to really construct an image about which microfinance model represents a 'win-win' situation.

Another interesting analysis would be to find a way to analyse the financial performance excluding grants and donors. Excluding subsidies and donors would show the strengths and weaknesses of the management abilities. Nowadays, MFOs are mainly related to the subsidies, however, this help might also have a limited time horizon.

This research uses a relative small data set, and therefore to construct proper conclusions, it might be interesting to evaluate more MFIs. It can be good to compare different types of MFOs in different countries. However, this will take much more time due to the fact that the financial data is frequently not public available. A larger dataset can lead to a better comparison between MFOs and might explain the region difficulties between countries. It would be very interesting to analyse why the operating costs per borrower for rural areas are lower, as is found in my research.

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LIST OF APPENDICES

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Appendix A

Overview MFOs

	SACCOs	Operating Region
1	Mbagara	Dar es Salaam
2	Masoko Madogo Madogo	Dar es Salaam
3	Tandale	Dar es Salaam
4	WAT	Dar es Salaam
5	Temeke	Dar es Salaam
6	Tiptop	Dar es Salaam
7	Church	Dar es Salaam
8	USHIRIKA	Dar es Salaam
9	Dovya	Dar es Salaam
10	TUICO	Dar es Salaam
11	Urafiki	Dar es Salaam
12	Mtoni	Dar es Salaam
13	Lumumba	Dar es Salaam
14	CHAKU	Dar es Salaam
15	YOSEFO	Dar es Salaam
16	CDEFU	Dar es Salaam
17	Binagi	Mara
18	Bunda	Mara
19	Kisorya	Mara
20	Musoma	Mara
21	Mwibara	Mara
22	Mwissimu	Mara
23	Nyagutaki	Mara
24	Sirari	Mara
25	Bukanda	Mwanza
26	Kabila	Mwanza
27	Kalemela	Mwanza
28	Magu	Mwanza
29	Mikula	Mwanza
30	Muhanane	Mwanza
31	Mwandoi	Mwanza
32	Nansio	Mwanza
33	Umoja	Mwanza
34	Changanyikeni	Ruvuma
35	Kilagano	Ruvuma
36	Kitanda	Ruvuma
37	Luegu	Ruvuma
38	Matimila	Ruvuma
39	Mgombasi	Ruvuma
40	Mkongo	Ruvuma
41	Msindo	Ruvuma
42	Narwi	Ruvuma
43	Wino	Ruvuma

Microfinance Institution (MFIs)		
44	SEDA	Arusha
45	Brac	Dar es Salaam
46	SEF Tanzania	Dar es Salaam
47	Selfina	Dar es Salaam
48	Faulu	Dar es Salaam
49	FINCA	Dar es Salaam
50	PRIDE	Dar es Salaam
51	PTF	Dar es Salaam
52	Tujijenge Africa	Dar es Salaam
Commercial Banks		
53	NMB Bank	Dar es Salaam
54	CRDB	Dar es Salaam
55	DAR Community Bank	Dar es Salaam
56	Akiba	Dar es Salaam
57	Uchumi Commercial Bank	Dar es Salaam
58	Tanzania Postal Bank	Dar es Salaam
59	Mufindi Community Bank (MuCoBa)	Iringa
60	Kagera Farmers' Co-op Bank	Kagera
61	Kilimanjaro Co-op Bank	Kilimanjaro
62	Mwanga Community Bank	Mwanga
63	MBINGA	Ruvuma

Appendix B
Variable definition

Indicator	Definition
<i>Financial performance</i>	
Operational Self Sufficiency (OSS)	Operating revenue/ (Financial expenses + Loan loss provision expense + Operating expenses)
Return on Assets (ROA)	Net operating income after taxes / Average total assets
<i>Outreach</i>	
Borrowers	Total number of borrowers
Percentage of women borrowers	Total women borrowers/ Total number of borrowers
Average loan size per borrower in dollars	Total loan size/ Total number of borrowers
<i>Financial Structure</i>	
Loan to assets ratio	Total loan size/ Total assets
<i>Efficiency and productivity</i>	
Borrowers per staff member	Number of borrowers/ Number of staff members
Cost per borrowers in dollars	Operating expenses/ Total number of borrowers
<i>Financial management</i>	
Portfolio yield	Interest income from the loan portfolio/Average gross loan size
<i>Portfolio quality</i>	
PAR > 30 days	Outstanding loan, loans > 30 days overdue
<i>Breath</i>	
Institution size	Total loan size

APPENDIX C

Table 3
Descriptive data of the SACCOs, MFIs and the Commercial Banks.

Indicator	SACCOs					MFIs					Commercial Banks								
	Mean	Median	Maximum	Minimum	Standard Deviation	Mean	Median	Maximum	Minimum	Standard Deviation	Mean	Median	Maximum	Minimum	Standard Deviation				
<i>Financial performance</i>																			
	Operational Self Sufficiency (OSS)	N=43	85.67%	90.00%	146.04%	21.31%	29%	N=9	101.74%	97.71%	165.07%	71.16%	29.00%	N=11	117%	115%	135%	109%	7%
Return on Assets (ROA)	N=43	-3.01%	0.10%	7.07%	-33.98%	9%	N=9	-2.55%	-0.85%	16.38%	-17.53%	10.00%	N=11	3%	2%	7%	-3%	3%	
<i>Outreach</i>	Borrowers (in 1000)	N=43	1.91	1.24	7.21	0.28	1.62	N=9	24910.22	10047.00	89783.00	1198.00	30715.00	N=11	90050	15003	456783	4679	167041
	Percentage of women borrowers	N=43	42.16%	33.79%	99.00%	10.00%	24%	N=9	78.28%	72.00%	100.00%	57.30%	16.00%	N=3	41%	40%	54%	30%	12%
	Average loan size per borrower in dollars	N=43	347.36	263.74	1356.07	56.00	27%	N=9	189.42	141.00	535.00	89.00	135.00	N=11	569.49	426	1.171	130	358
<i>Efficiency and productivity</i>	Borrowers per staff member	N=43	523.6	488	1622	14	352	N=9	287.76	223	1002	70	279	N=3	222	288	299	80	123
	Cost per borrowers in dollars	N=33	11.96	10.74	26.81	3.75	5	N=9	75.36	70.7	123.64	19.59	34	N=2	156	156	270	42	161
Financial management																			
Portfolio yield	N=33	32.95%	28.44%	76.23%	6.00%	20%	N=8	37.60%	35.40%	62.49%	20.60%	14.00%	N=11	21.90%	21.00%	33.00%	15.00%	5.70%	
<i>Portfolio quality</i>	PAR > 30 days	N=43	14.85%	9.00%	78.80%	0.00%	19%	N=9	4.04%	1.50%	14.34%	0.00%	6.00%	N=3	10%	5%	18%	5%	8%
<i>Breath</i>	Institution size (total loan size in 1000 dollar)	N=43	129.70	37.89	909.09	4.65	217	N=9	3.839	1.810	16.365	200	5.129	N=11	85.003	2.802	534.861	670	175.000

Table 5
Descriptive data for MFOs operating in rural and urban areas.

Indicator	Rural						Urban					
	Obs.	Mean	Median	Maximum	Minimum	Standard Deviation	Obs.	Mean	Median	Maximum	Minimum	Standard Deviation
<i>Financial performance</i>												
Operational Self Sufficiency (OSS)	N=29	86,70	81,50	1,42	0,21	0,28	N=34	99	1,03	1,65	33	28,8
Return on Assets (ROA)	N=29	-2,4%	-0,7%	7,0%	-15,9%	6,2%	N=34	-1,6%	1,3%	16,3%	-3,3%	9,9%
<i>Outreach</i>												
Borrowers (in 1000)	N=29	2,76	1,19	17,58	0,67	3,56	N=34	35,9	3,4	456	280	101
Percentage of women borrowers	N=26	29,0%	29,0%	68,0%	10,0%	11,0%	N=29	65%	68%	100%	26%	23%
Average loan size per borrower (\$)	N=29	335	276	1.356	100	242	N=34	388	236	1170	56	330
<i>Efficiency and productivity</i>												
Borrowers per staff member	N=29	647	522	1.622	263	313	N=34	300	217	1002	14	267
Cost per borrowers in dollars	N=26	14,3	10	93	4	18	N=19	52	25	270	8,5	62
<i>Financial management</i>												
Portfolio yield*	N=29	33,0%	24,0%	76,0%	6,0%	18,6%	N=23	29%	26%	63%	11%	11%
<i>Portfolio quality</i>												
PAR > 30 days	N=34	33,7%	30,2%	76,2%	6,1%	17,6%	N=29	7,6%	5,4%	32,0%	0,0%	7,7%
<i>Breath</i>												
Institution size (in 1000)	N=40	445	29,7	28	4,5	878	N=34	28301	475	534.861	25	4128

Table 6*The total descriptive data from all the microfinance organisation.*

Indicator		Total				
		Mean	Median	Maximum	Minimum	Standard Deviation
<i>Financial performance</i>						
Operational Self Sufficiency (OSS)	N=63	93%	98%	165%	29%	28%
Return on Assets (ROA)	N=63	-2%	1%	16%	-34%	8%
<i>Outreach</i>						
Borrowers (*1000)	N=63	21	2	457	0,28	76
Percentage of women borrowers	N=55	48%	36%	100%	10%	26%
Average loan size per borrower in dollars	N=63	364	264	1356	56	292
<i>Financial structure</i>						
Loan to assets ratio	N=53	51,96%	52,80%	112,80%	13,87%	17,89%
<i>Efficiency and productivity</i>						
Borrowers per staff member***	N=63	460	439	1622	14	336
Cost per borrowers in dollars****	N=43	30	12	270	4	47
<i>Financial management</i>						
Portfolio yield*	N=52	31%	26%	76%	6%	16%
<i>Portfolio quality</i>						
PAR > 30 days**	N=55	13%	7%	79%	0%	17%
<i>Breath</i>						
Institution size (*1000)	N=63	15.479	109	534.861	5	77.437

Table 7*Correlations for all MFOs*

	ROA	OSS	Av. loan size	Loan to assets ratio	Total Borrowers	Interest yield	Bor. per staff member	Total loan size
ROA	1,00							
OSS	0,78	1,00						
Average loan size	0,13	0,21	1,00					
Loan to assets ratio	0,10	0,29	0,07	1,00				
Total Borrowers	0,19	0,19	0,39	-0,05	1,00			
Interest yield	-0,03	-0,10	-0,40	-0,38	-0,10	1,00		
Borrowers per staff member	-0,02	-0,13	0,01	-0,29	-0,12	0,23	1,00	
Total loan size	0,17	0,14	0,42	-0,08	0,97	-0,12	-0,09	1,00

Table 8
Correlations for the SACCOs and the MFI.

	ROA	OSS	PAR >30	Cost per Borrower	IR	Av. Loan size	Loan to assets ratio	Bor. staff	Per Total bor.	% women bor.	Total loan size
ROA	1,00										
OSS	0,78	1,00									
PAR >30	-0,05	-0,13	1,00								
Cost per Bor.	-0,19	0,04	-0,21	1,00							
IR	0,08	0,03	0,58	0,09	1,00						
Av. Loan size	0,06	0,12	-0,17	-0,20	-0,45	1,00					
Loan to assets ratio	0,09	0,30	-0,33	0,33	-0,34	0,11	1,00				
Bor. Per staff	0,01	-0,07	0,37	-0,47	0,18	0,17	-0,34	1,00			
Total bor.	0,13	0,26	-0,17	0,45	0,02	-0,15	0,36	-0,19	1,00		
% women bor.	0,21	0,43	-0,41	0,56	-0,08	-0,27	0,63	-0,70	0,33	1,00	
Total loan size	0,11	0,22	-0,17	0,46	0,04	-0,15	0,39	-0,20	0,97	0,32	1,00

Table 10
Financial performance regressions for all the three different types of organisations, allowing non linear for the interest yield and the average loan.

	OSS (2)	ROA (2)		OSS (2)	ROA (2)
Interest Yield	2,136	0,100	Interest Yield	0,374	0,062
	[1,917]*	[0,357]		[0,992]	[0,652]
Interest Yield Squared	-2,193	-0,048	Average Loan size per borrower	0,001	0,062
	[-2,075]**	[-0,175]		[1,614]	[0,596]
Average Loan size per borrower	0,000	0,000	Average Loan size per borrower Squared	0,000	0,000
	[2,902]***	[2,210]**		[-1,052]	[-0,094]
Borrowers per staff member	0,000	0,000	Borrowers per staff member	0,000	0,000
	[2,477]**	[2,630]**		[2,639]**	[2,457]**
Loan to assets ratio	0,212	0,007	Loan to assets ratio	0,170	0,006
	[0,564]	[0,060]		[0,471]	[0,0533]
Total portfolio loan size (\$)	0,000	0,000	Total portfolio loan size (\$)	0,000	0,000
	[-1,733]*	[-0,254]		[-1,832]*	[-0,265]
Urban	0,040	-0,004	Urban	0,034	-0,004
	[0,398]	[-0,110]		[0,324]	[-0,113]
Sacco	-0,049	-0,164	Sacco	0,091	-0,161
	[-0,140]	[-1,811]*		[0,252]	[-1,582]
MFI	0,238	-0,101	MFI	0,482	-0,096
	[0,462]	[-0,732]		[1,047]	[-0,731]
Commercial Banks	0,388	-0,071	Commercial Banks	0,535	-0,068
	[1,095]	[-0,763]		[1,504]	[-0,672]
Observations	52	52	Observations	52	52
Adjusted R- Squared	0,309	0,032	Adjusted R- Squared	0,269	0,032

* significant at 10%, ** significant at 5%, *** significant at 1 %. t-stats in brackets
(2) White Heteroskedasticity Consistent Standard Errors & Covariance.

Table 11

Financial performance regressions for all the three different types of organisations, allowing non linear for the interest yield including the log function of the total portfolio loan size.

	OSS (1)	OSS (2)	ROA (1)	ROA (2)
Interest Yield	1,593 [1,521]	1,593 [1,265]	-0,068 [-0,187]	-0,068 [-0,220]
Interest Yield Squared	-1,545 [-1,284]	-1,545 [-1,250]	0,152 [0,366]	0,152 [0,493]
Average Loan size per borrower	0,000 [0,537]	0,000 [0,506]	0,000 [0,156]	0,000 [0,192]
Borrowers per staff member	0,000 [2,086]**	0,000 [2,864]***	0,000 [1,951]**	0,000 [3,153]***
Loan to assets ratio	0,259 [0,843]	0,259 [0,763]	0,005 [0,046]	0,005 [0,0528]
Log of the total portfolio loan size (\$)	0,067 [1,778]*	0,067 [1,503]	0,020 [1,496]	0,020 [1,644]
Urban	0,065 [0,737]	0,065 [0,677]	0,001 [0,020]	0,001 [0,018]
Sacco	-0,575 [-1,459]	-0,575 [-1,567]	-0,314 [-2,307]**	-0,314 [-3,394]***
MFI	-0,635 [-1,125]	-0,635 [-1,256]	-0,343 [-1,759]*	-0,343 [-2,520]**
Commercial Banks	-0,526 [-0,947]	-0,526 [-0,997]	-0,325 [-1,695]*	-0,325 [-2,244]**
Observations	52	52	52	52
Adjusted R- Squared	0,347	0,347	0,081	0,081

* significant at 10%, ** significant at 5%, *** significant at 1 %. t-stats in brackets

(1) OLS estimation. (2) White Heteroskedasticity Consistent Standard Errors & Covariance.

Table 12

Financial performance regressions for all the three different types of organisations, allowing non linear for the average loan size including the log function of the total portfolio loan size

	OSS (1)	OSS (2)	ROA (1)	ROA (2)
Interest Yield	0,345 [1,175]	0,345 [1,024]	0,054 [0,540]	0,054 [0,629]
Average Loan size per borrower	0,000 [0,705]	0,000 [0,570]	0,000 [-0,138]	0,000 [-0,132]
Average Loan size per borrower squared	0,000 [-0,646]	0,000 [-0,549]	0,000 [0,228]	0,000 [0,256]
Borrowers per staff member	0,000 [2,210]**	0,000 [3,217]***	0,000 [1,796]*	0,000 [2,763]***
Loan to assets ratio	0,231 [0,741]	0,231 [0,725]	0,008 [0,075]	0,008 [0,085]
Log of the total portfolio loan size (\$)	0,078 [2,104]**	0,078 [1,769]*	0,019 [1,470]	0,019 [1,549]
Urban	0,063 [0,706]	0,063 [0,640]	0,001 [0,029]	0,001 [0,026]
Sacco	-0,561 [-1,381]	-0,561 [-1,473]	-0,314 [-2,272]**	-0,314 [-3,514]***
MFI	-0,606 [-1,058]	-0,606 [-1,149]	-0,346 [-1,774]*	-0,346 [-2,536]**
Commercial Banks	-0,565 [-1,003]	-0,565 [-1,043]	-0,320 [-1,668]	-0,320 [-2,279]**
Observations	52	52	52	52
Adjusted R- Squared	0,328	0,328	0,079	0,079

* significant at 10%, ** significant at 5%, *** significant at 1%. t-stats in brackets

(1) OLS estimation. (2) White Heteroskedasticity Consistent Standard Errors & Covariance.

Tabel 14

Financial performance regressions for all the three different types of organisations, allowing non linear for the average loan size including the log function of the total portfolio loan size

	OSS (1)	OSS (2)	ROA (1)	ROA (2)
Interest Yield * SACCO	2,606 [2,690]**	2,606 [3,026]***	0,226 [0,610]	0,226 [1,149]
Interest Yield * MFI	-11,116 [-3,094]***	-11,116 [-3,918]***	-3,395 [-2,468]**	-3,395 [-3,036]***
Interest Yield * Commercial Banks	16,627 [1,713]*	16,627 [1,862]*	3,143 [0,796]	3,143 [1,315]
Interest Yield Squared * SACCO	-2,350 [-2,167]**	-2,350 [-2,670]**	-0,083 [2,215]**	-0,083 [-0,379]
Interest Yield Squared * MFI	12,258 [2,791]**	12,258 [3,819]***	3,725 [-0,820]	3,725 [2,819]***
Interest Yield Squared * Commercial Banks	-35,005 [-1,559]	-35,005 [-1,944]*	-7,052 [-0,820]	-7,052 [-1,415]
Average Loan size per borrower	0,000 [-0,036]	0,000 [-0,032]	0,000 [-0,253]	0,000 [-0,343]
Borrowers per staff member	0,000 [2,528]**	0,000 [2,746]***	0,000 [2,062]**	0,000 [2,617]**
Loan to Assets ratio	0,476 [1,713]*	0,476 [1,902]*	0,070 [0,657]	0,070 [0,919]
Log of the total portfolio loan size	0,103 [2,836]***	0,103 [2,717]***	0,028 [1,991]**	0,028 [2,644]**
Urban	0,012 [0,160]	0,012 [0,148]	-0,014 [-0,485]	-0,014 [-0,437]
SACCO	-1,220 [-3,296]***	-1,220 [-3,309]***	-0,479 [-3,381]***	-0,479 [-4,607]***
MFI	1,321 [1,823]*	1,321 [2,210]**	0,189 [0,680]	0,189 [0,785]
Commercial Banks	-2,731 [-1,947]*	-2,731 [-2,155]**	-0,808 [-1,504]	-0,808 [-2,447]**
Observations	63	63	63	63
Adjusted R-Squared	0,542	0,542	0,207	0,207

* significant at 10%, ** significant at 5%, *** significant at 1 %. t-stats in brackets

(1) OLS estimation. (2) White Heteroskedasticity Consistent Standard Errors & Covariance.

Table 16*Profitability regression for the SACCOs and MFIs, allowing non linear effects the interest yield rate per type of MFO*

	OSS (2)	ROA (2)		OSS (2)	ROA (2)
Interest Yield	2,539	0,157	Interest Yield	0,419	0,093
	[2,446]**	[0,573]		[1,145]	[0,927]
Interest Yield Squared	-2,566	-0,093	Average Loan size per borrower	0,001	0,000
	[-2,518]**	[-0,338]		[0,893]	[0,696]
Average Loan size per borrower	0,000	0,000	Average Loan size per borrower Squared	0,000	0,000
	[1,922]*	[1,375]		[-0,597]	[-0,395]
Borrowers per staff member	0,000	0,000	Borrowers per staff member	0,000	0,000
	[2,476]**	[2,402]**		[2,751]***	[2,552]**
Loan to Assets ratio	0,184	-0,018	Loan to Assets ratio	0,152	-0,023
	[0,514]	[-0,150]		[0,432]	[-0,199]
Total portfolio loansize	0,000	0,000	Total portfolio loansize	0,000	0,000
	[0,974]	[1,532]		[1,299]	[1,686]
Percentage of women borrowers	1,233	0,193	Percentage of women borrowers	1,070	0,178
	[1,977]*	[0,890]		[1,610]	[0,747]
Urban	-0,116	-0,041	Urban	-0,099	-0,042
	[-0,930]	[-0,866]		[-0,774]	[-0,858]
MFI	-0,235	-0,021	MFI	-0,090	-0,004
	[-0,768]	[-0,170]		[-0,249]	[-0,025]
Constant	-0,481	-0,228	Constant	-0,214	-0,237
	[-1,678]	[-2,997]***		[-0,661]	[-2,567]**
Observations	52	52	Observations	52	52
Adjusted R- Squared	0,265	0,097	Adjusted R- Squared	0,215	-0,033

* significant at 10%, ** significant at 5%, *** significant at 1 %. t-stats in brackets

(1) OLS estimation. (2) White Heteroskedasticity Consistent Standard Errors & Covariance.

Table 17*Financial performance regression for the SACCOs and MFIs, allowing non linear effects of the interest yield rate per type of MFO including the log function of the total portfolio loan size*

	OSS (1)	OSS (2)	ROA (1)	ROA (2)
Interest Yield	1,593	1,593	-0,068	-0,068
	[1,521]	[1,265]	[-0,187]	[-0,220]
Interest Yield Squared	-1,545	-1,545	0,152	0,152
	[-1,284]	[-1,250]	[0,366]	[0,493]
Average Loan size per borrower	0,000	0,000	0,000	0,000
	[0,537]	[0,506]	[0,156]	[0,192]
Borrowers per staff member	0,000	0,000	0,000	0,000
	[2,086]**	[2,864]***	[1,951]**	[3,153]***
Loan to assets ratio	0,259	0,259	0,005	0,005
	[0,843]	[0,763]	[0,046]	[0,0528]
Log of the total portfolio loan size (\$)	0,067	0,067	0,020	0,020
	[1,778]*	[1,503]	[1,496]	[1,644]
Urban	0,065	0,065	0,001	0,001
	[0,737]	[0,677]	[0,020]	[0,018]
Sacco	-0,575	-0,575	-0,314	-0,314
	[-1,459]	[-1,567]	[-2,307]**	[-3,394]***
MFI	-0,635	-0,635	-0,343	-0,343
	[-1,125]	[-1,256]	[-1,759]*	[-2,520]**
Commercial Banks	-0,526	-0,526	-0,325	-0,325
	[-0,947]	[-0,997]	[-1,695]*	[-2,244]**
Observations	52	52	52	52
Adjusted R- Squared	0,347	0,347	0,081	0,081

* significant at 10%, ** significant at 5%, *** significant at 1 %. t-stats in brackets

(1) OLS estimation. (2) White Heteroskedasticity Consistent Standard Errors & Covariance.

Table 18

Financial performance regression for the SACCOs and MFIs, allowing non linear effects of the average portfolio loan size per type of MFO including the log function of the total portfolio loan size

	OSS (1)	OSS (2)	ROA (1)	ROA (2)
Interest Yield	0,345 [1,175]	0,345 [1,024]	0,054 [0,540]	0,054 [0,629]
Average Loan size per borrower	0,000 [0,705]	0,000 [0,570]	0,000 [-0,138]	0,000 [-0,132]
Average Loan size per borrower squared	0,000 [-0,646]	0,000 [-0,549]	0,000 [0,228]	0,000 [0,256]
Borrowers per staff member	0,000 [2,210]**	0,000 [3,217]***	0,000 [1,796]*	0,000 [2,763]***
Loan to assets ratio	0,231 [0,741]	0,231 [0,725]	0,008 [0,075]	0,008 [0,085]
Log of the total portfolio loan size (\$)	0,078 [2,104]**	0,078 [1,769]*	0,019 [1,470]	0,019 [1,549]
Urban	0,063 [0,706]	0,063 [0,640]	0,001 [0,029]	0,001 [0,026]
Sacco	-0,561 [-1,381]	-0,561 [-1,473]	-0,314 [-2,272]**	-0,314 [-3,514]***
MFI	-0,606 [-1,058]	-0,606 [-1,149]	-0,346 [-1,774]*	-0,346 [-2,536]**
Commercial Banks	-0,565 [-1,003]	-0,565 [-1,043]	-0,320 [-1,668]	-0,320 [-2,279]**
Observations	52	52	52	52
Adjusted R- Squared	0,328	0,328	0,079	0,079

* significant at 10%, ** significant at 5%, *** significant at 1 %. t-stats in brackets

(1) OLS estimation. (2) White Heteroskedasticity Consistent Standard Errors & Covariance.

Table 20

Financial performance regression for the SACCOs and MFIs, allowing non linear effects of the interest yield and the average portfolio loan size per type of MFO including the log function of the total portfolio loan size

	Log OCB (1)	Log OCB (2)		Log OCB (1)	Log OCB (2)
Interest yield	2,237 [1,362]	2,237 [1,533]	Interest yield	0,792 [1,801]*	0,792 [1,610]
Interest yield squared	-1,765 [-0,943]	-1,765 [-1,100]	Average loan size per borrower	0,001 [0,683]	0,001 [0,571]
Average loan size per borrower	0,000 [1,200]	0,000 [1,173]	Average loan size per borrower squared	0,000 [-0,377]	0,000 [-0,370]
Borrowers per staff member	-0,001 [-3,949]***	-0,001 [-3,796]***	Borrowers per staff member	-0,001 [-3,677]***	-0,001 [-3,753]***
Total loan to assets ratio	0,611 [1,276]	0,611 [1,147]	Total loan to assets ratio	0,554 [1,147]	0,554 [1,091]
Log of total loan size	0,001 [0,010]	0,001 [0,008]	Log of total loan size	0,028 [0,391]	0,028 [0,346]
Women	-0,646 [-0,924]	-0,646 [-0,725]	Women	-0,837 [-1,202]	-0,837 [-0,835]
Urban	0,290 [1,868]	0,290 [2,187]**	Urban	0,299 [1,900]*	0,299 [2,143]**
MFI	1,468 [3,710]***	1,468 [3,181]***	MFI	1,509 [3,467]***	1,509 [2,704]**
Constant	2,143 [3,193]***	2,143 [3,265]***	Constant	2,099 [2,983]***	2,099 [3,342]***
Observations	52	52	Observations	52	52
Adjusted R-Squared	0,821	0,821	Adjusted R-Squared	0,817	0,817

* significant at 10%, ** significant at 5%, *** significant at 1 %. t-stats in brackets.

(1) OLS estimation. (2) White Heteroskedasticity Consistent Standard Errors & Covariance.

Table 22

Financial performance regression for the SACCOs and MFIs, allowing non linear effects of the interest yield and the average portfolio loan size per type of MFO including the log function of the total portfolio loan size.

	PAR (1)	PAR (2)		PAR (1)	PAR (2)
Interest Yield	0,153 [0,209]	0,153 [0,206]	Interest Yield	0,579 [3,086]***	0,579 [3,440]***
Interest Yield squared	0,618 [0,741]	0,618 [0,664]	Average Loan size per borrower	-0,001 [-1,823]*	-0,001 [-1,707]*
Average Loan size per borrower	0,000 [-1,124]	0,000 [-1,650]	Average Loan size per borrower squared	0,000 [1,577]	0,000 [1,651]
Borrowers per staff member	0,000 [0,191]	0,000 [0,236]	Borrowers per staff member	0,000 [-0,193]	0,000 [-0,243]
Loan to assets ratio	0,160 [0,751]	0,160 [0,867]	Loan to assets ratio	0,197 [0,954]	0,197 [1,096]
Log of total loan size	0,000 [-0,014]	0,000 [-0,020]	Log of total loan size	-0,007 [-0,226]	-0,007 [-0,295]
Women	-0,064 [-0,204]	-0,064 [-0,261]	Women	0,058 [0,196]	0,058 [0,223]
Urban	0,032 [0,469]	0,032 [0,645]	Urban	0,039 [0,586]	0,039 [0,806]
MFI	-0,196 [-1,110]	-0,196 [-1,503]	MFI	-0,303 [-1,630]	-0,303 [-1,812]*
Constant	0,035 [0,117]	0,035 [0,177]	Constant	0,151 [0,503]	0,151 [0,696]
Observations	41	41	Observations	41	41
Adjusted R-Squared	0,764	0,764	Adjusted R-Squared	0,383	0,383

* significant at 10%, ** significant at 5%, *** significant at 1 %. t-stats in brackets

(1) OLS estimation. (2) White Heteroskedasticity Consistent Standard Errors & Covariance.

APPENDIX D

Robustness check for the total portfolio loan size variable

