Masterthesis

Microfinance and Rating

By Alla Steffensen

The masterthesis is carried out as a part of the education at Agder University College and is therefore approved as such. However, this does not imply that the College answers for the methods that are used or the conclusions that are drawn.

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Preface

Taking a master degree at Agder University has been an interesting and enriching experience. The study has come to an end and the only master thesis is left.

Konrad Adenauer once said: “We all live under the same sky, but we don’t all have the same horizon” (Quotegarden, 2007). Learning about how financial services can help the poor and the vulnerable opened a whole new perspective for me. It was the Nobel Peace Prize 2006 that first brought microfinance to my attention. It was fascinating to see how financial and social goals can be connected. Therefore I decided to write my master thesis about microfinance.

I would like to thank a Ph.D. student Roy Mersland for introducing me to the microfinance rating industry. He kindly agreed to be my supervisor and was very helpful in guiding me through this process. Furthermore, Roy Mersland developed the dataset used in this study. It was a big honor and pleasure to be working with him.

I would also like to thank my husband for his inspiration and support. Thank you very much for taking care of our junior.

Lyngdal, June 1st 2008

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Alla Steffensen

Abstract

This master thesis starts by introducing the concept of microfinance. It shows that MFI rating is an important tool in achieving transparency.

The study attempts to determine the relationship between social and financial indicators and the MFI rating grade. These indicators are chosen based on previous studies on ratings and microfinance. The data comes from ratings reports performed by five major MFI rating agencies: MicroRate, Planet Rating, Microfinanza, Crisil and M-Cril. Data transformation was used to achieve normal distribution of the variables.

The empirical research was carried out using multiple regression analysis. A few equations were tested to find the optimal model. The findings of the study revealed that MFI size, risk, profitability, productivity and efficiency are significant determinants of rating grades. Larger and less riskier MFI tend to get better rating grades. Increasing profitability, productivity and efficiency of the MFI will increase the rating grade. No significant relationship between the social performance of MFI and the rating grade assigned was found. Control variables were used to account for the possible affect of MFI region, motive (profit or not) and agency that performed the rating. Only one out of six regions was significant in explaining the model - Europe and Central Asia. It didn't matter whether MFI was a non-profit organization or not. The grade was, however, affected by the agency that performed the rating.

Table of Contents

1. Introduction

In the past years more and more attention has been given to microfinance. Year 2005 was announced as international year of microcredit. In 2006 the Nobel Peace Prize was awarded to Grameen Bank and it's founder Muhammad Yunus. Today MFIs can be found all over the world providing financial services to the poor. To many of us, the concept of microfinance is still rather new.

With the microfinance industry evolving and maturing, the need for transparency is increasing. Ratings are a part of a transparency sequence. They help MFIs to get funds, benchmark their position, compare it with peers and improve performance. Some MFI are, however, reluctant, of being rated in fear of getting a bad grade. The paper discusses the benefits of ratings and shows that achieving transparency in the microfinance industry benefits all.

This paper describes microfinance and the microfinance rating industry. It shows that ratings are an important step on the way to transparency. Little research has been done on the rating of MFIs. Based on previous studies, several financial and social indicators are chosen as determinants of ratings. The empirical research aims to identify the relationship, if such exists, between the rating grade assigned to MFI and its size, risk, productivity and efficiency, profitability and social performance.

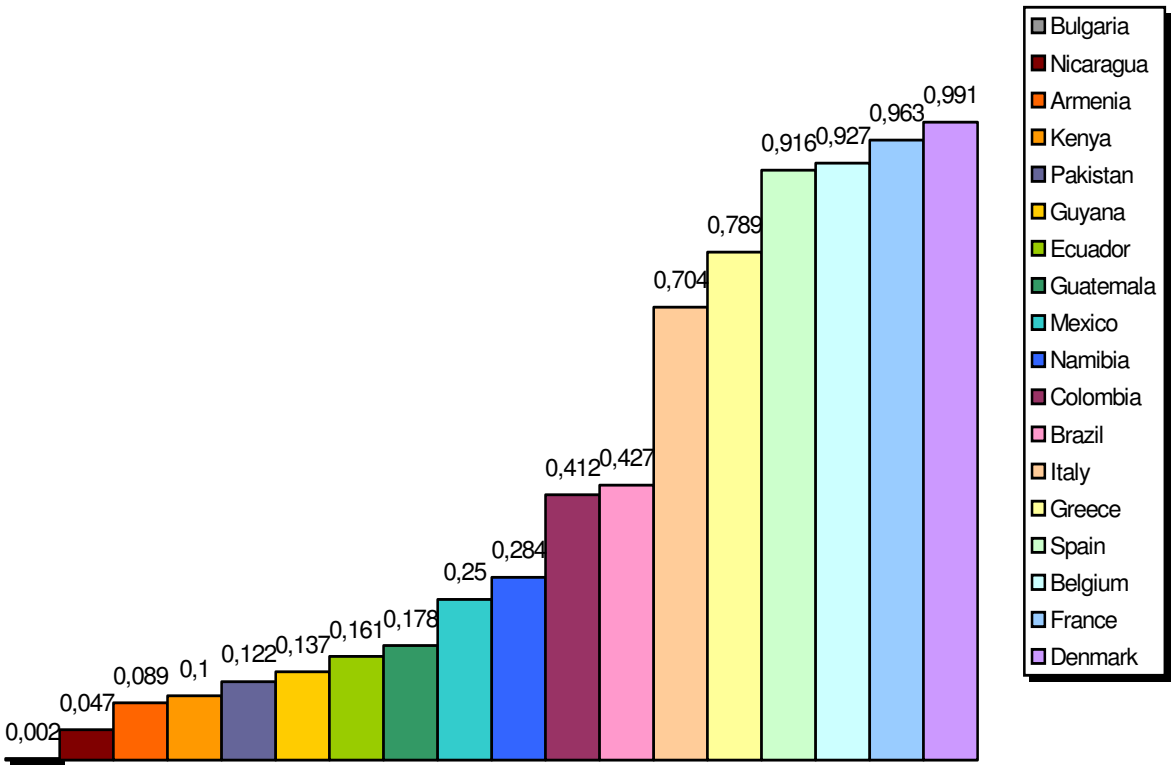
2. Microfinance Overview

2.1. The "Unbanked"

Access to financial services is a part of our everyday life: we get our salary to a bank account, use it to pay bills, own a debit or a credit card (or often both), have a savings account, a loan and insurance. Now think if all this was unavailable… I know that for me, daily transactions/chores would become much more time consuming, inconvenient and some simply impossible (like buying a house).

While the majority of the households in Europe (except Eastern Europe) have a bank account, the situation differs dramatically in developing countries (Figure 2.1):

Figure 2.1. Household Share with a Bank Account



Source: Beck, Demirguc-Kunt, Peria, 2005

The share of households with a bank account is highest for Western and Northern Europe (0,916 to 0,991) and decreases slightly for Southern Europe (0,789 for Greece and 0,704 for

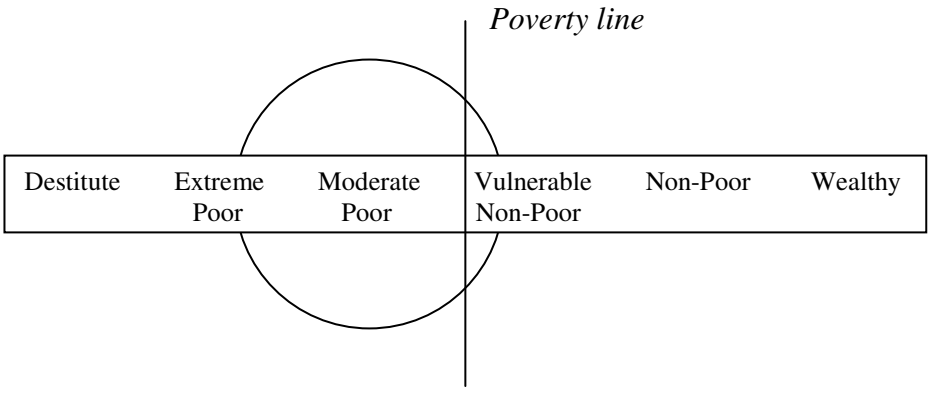
Italy). A bit less than half of households in Colombia and Brazil have a bank account. Furthermore, the number of households with a bank account drops to only 0,002 for Bulgaria or 0,047 for Nicaragua.

As we see, access to financial services is limited in many developing countries. There is a number of reasons why so many people are "unbanked". The poor may simply find the products unattractive. Banks may be not willing to provide services due to high transaction costs and high risk. Even issues like culture and gender can limit the access to financial services (The Blue Book, 2006) But one thing is clear: "poor and low-income people want financial services that match their needs to better manage their households and businesses" (The Blue Book, 2006).

2.2. The Clients

Microfinance aims to provide financial services to the poor. Research shows that typical microfinance clients come from moderately poor and vulnerable to non-poor households with some from extreme-poor households. Destitute households remain still unreached (Helms, 2006).

Figure 2.2 How Poor Are Microfinance Clients?



Source: Cohen, 2003

Microfinance clients are typically self-employed farmers, shopkeepers, vendors, service providers etc. (Mixmarket, 2008). Often they lack collateral and can't apply for a bank loan.

Grameen Bank has a special program developed for beggars. They can apply for interest-free loans. The repayment installments are very small – for ex. 3,4 US cents per week (*Rutherford, 2003*). The program aims to improve living conditions of the beggars and the destitute by providing access to financial services.

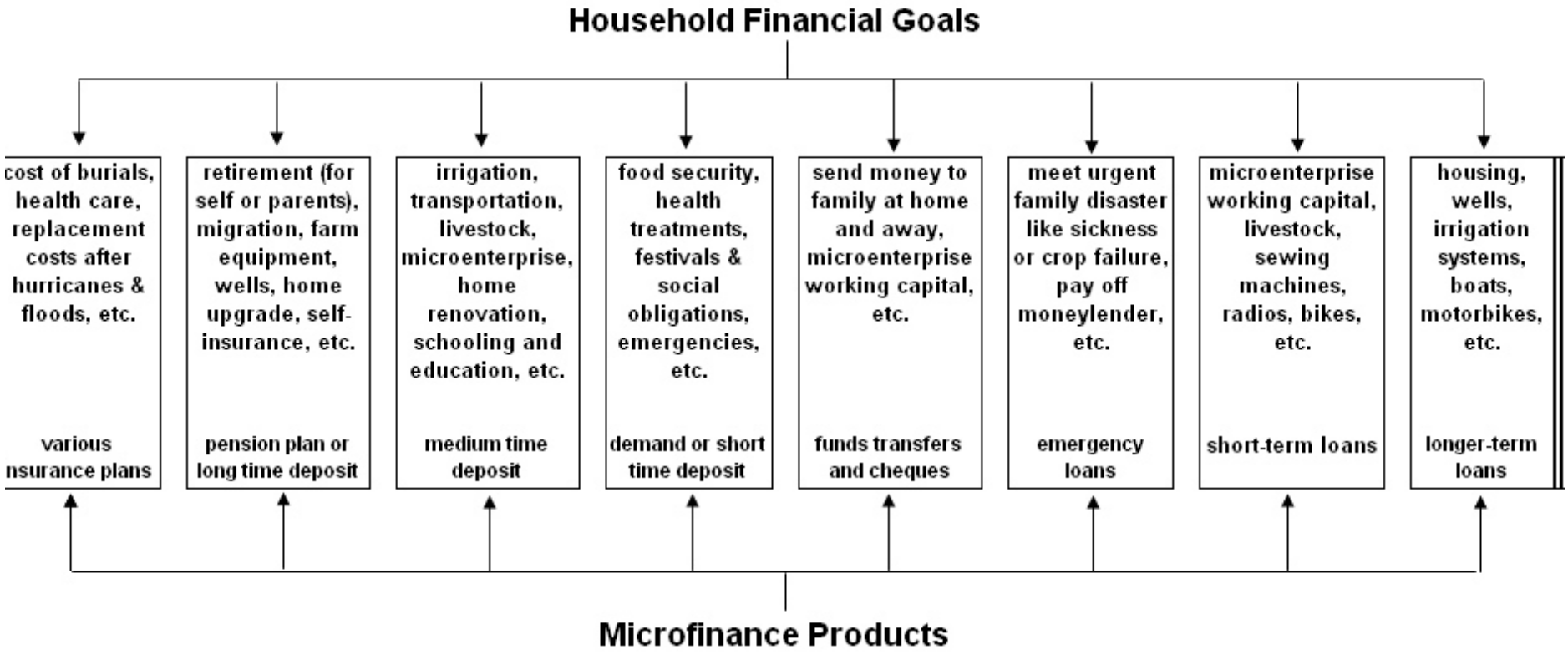
2.3. Inclusive Financial Services

Previously microfinance (then microcredit) was about providing loans. But the poor showed that there exists a demand for a variety of financial services. That's what modern microfinance is about:

providing inclusive financial services such as loans, savings, money transfer and insurance to the poor.

Brett Matthews (Matthews,) provides a description of typical financial goals for poor households and the microfinance products that fit those needs. As we see, access to loans enables poor families to buy working capital and livestock, housing and helps in emergency situations. Deposit services enable customers to save for food, healthcare, transportation, livestock, education, pension etc. No less important is the ability to send money. While richer households usually use money transfer to pay bills (The Blue Book, 2006), poor households use remittances (migrant workers sending money home) or send money to (Helms, 2006). Poor families are more vulnerable to tragedies and disasters. Death or sickness of a breadwinner in the family can put the household in a serious financial trouble, while situation would be different if family had insurance.

Figure 2.3. Types of Microfinance Used by Poor People



Source: Brett Matthews, Mathwood Consulting Company

2.4. History of Microfinance

We will look into the history of microfinance. The first concepts behind it have existed for decades and can be found already in Europe in the Middle Ages (figure 2.4).

In 1462 a Franciscan monk in Perousa, Italy established the first public pawnshops in Perousa, Italy. The "mont-de-pietes" or "Banks of Pity" were organized as a charity institution and provided loans to the poor without charging interest (Expressloan, 2006).

Jonathan Swift founded the Irish Loan Fund System in the beginning of 1700s. The system was characterized by providing small funds locally. The repayment rates were high and it grew to 300 funds by the early 1840s. It was one of the largest financial organizations in Ireland and at its peak 20% of Irish households had loans there annually (Eh, 2008).

The first credit cooperatives were organized in Germany by Herman Schulze-Delitzsch and Friedrich Raiffeisen. Herman Schulze-Delitzsch's purpose was to provide cheaper bread (by organizing a cooperative-owned mill and bakery) and Friedrich Raiffeisen's was to enable farmers to a credit. These unions spread furthers through Germany, Europe and reached Canada in 1900 (NCUA, 2008).

Various types of formal saving and credit institutions began to appear in Latin America in 1900s. Though the early European immigrants introduced them, they were government or private owned and not by the clients as in Europe (Britannica, 2008).

After the World War II countries focused on developing the agricultural sector. State owned development finance institutions and farmers' cooperatives provided loans to the farmers. Providers were heavily subsidized and used below market interest rates. The demand for such loans increased a lot and loans ended up more and more often in the hands of government favored or better-off farmers. The repayment rates fell dramatically, since customers started to feel that these loans were more as a "gift" (Morduch, 2005).

In 1970s Grameen Bank in Bangladesh, ACCION International in Latin America and Self-Employed Women's Association Bank in India start providing small credits to the poor. This is the beginning of the modern microcredit.

Figure 2.4 The History of Microfinance

Since the beginning of time…
Informal saving and credit groups have operated for centuries across the developing world.

Middle Ages
In Europe an Italian monk created the first official pawnshop in 1462 to counter usury practices.
In 1515 Pope Leon X authorized pawnshops to charge interest to cover their operating costs.

1700s
Jonathan Swift initiates the Irish Loan Fund System, which provides small loans to poor farmers who have no collateral. At its peak, it is lending to 20% of all Irish households annually.

1800s
The concept of the financial cooperative is developed by Friedrich Wilhelm Raiffeisen and his supporters in Germany. From 1865, the cooperative movement expands rapidly within Germany and other countries in Europe, North America, and eventually developing countries.

Early 1900s
Adaptations of these models begin to appear in parts of rural Latin America.

1950-1970
Efforts to expand access to agricultural credit use state-owned development financial institutions, or farmers' cooperatives to channel concessional loans and on-lend to customers at below-market interest rates. These development banks lose most of all of their capital because their subsidized lending rates cannot cover their costs, including the cost of massive default.

Early 1970s
Experimental programs extend tiny loans to groups of poor women to invest in micro-business, and microcredit is born. Early pioneers include Grameen Bank; ACCION International and the Self-Employed Women's Association Bank

1980s
Microcredit programs throughout the world improve on original methodologies. Microlenders, such as Bank Rakayat Indonesia defy conventional wisdom about financing the poor. Cost-recovery interest rates and high repayments permit them to achieve long-term sustainability and reach large numbers of clients.

Early 1900s
The term "microcredit" begins to be replaced by "microfinance", which includes not only credit, but also saving and other services, such as insurance and money transfers.
Today

The borders between traditional microfinance and the larger financial system are starting to blur. In some countries, banks and other commercial actors are entering microfinance. Increasing emphasis is placed on building entire financial systems that work for the poor.

Source: Helms, 2006

In 1980s microcredit programs showed that:

1) repayments rates (especially for women) are better than in commercial banks
2) MFI can cover their costs

This meant that MFI don't have to depend on subsidies or government help. Bank Rakayat Indonesia (BRI) focused on covering its costs. Today BRI provides financial services to 30 million poor villagers.

Microcredit programs continue to expand in 1990s. The focus is being broadened from providing loans to also giving the poor a possibility to save, buy insurance, transfer and receive money. While MFI offer a whole range of microfinance services they also start thinking more about organization form. Earlier MFI were typically non-profit organizations, but more organizations are being organized or changed to for-profit MFI. Organization forms will be described later in this paper.

2.5. Grameen Bank

Grameen Bank is among pioneers in microfinance Furthermore, it's probably the best know MFI. Therefore I would like to dedicate a special attention and tell its story. Information on the history is taken from Grameen Bank's webpage (Grameen, 2008).

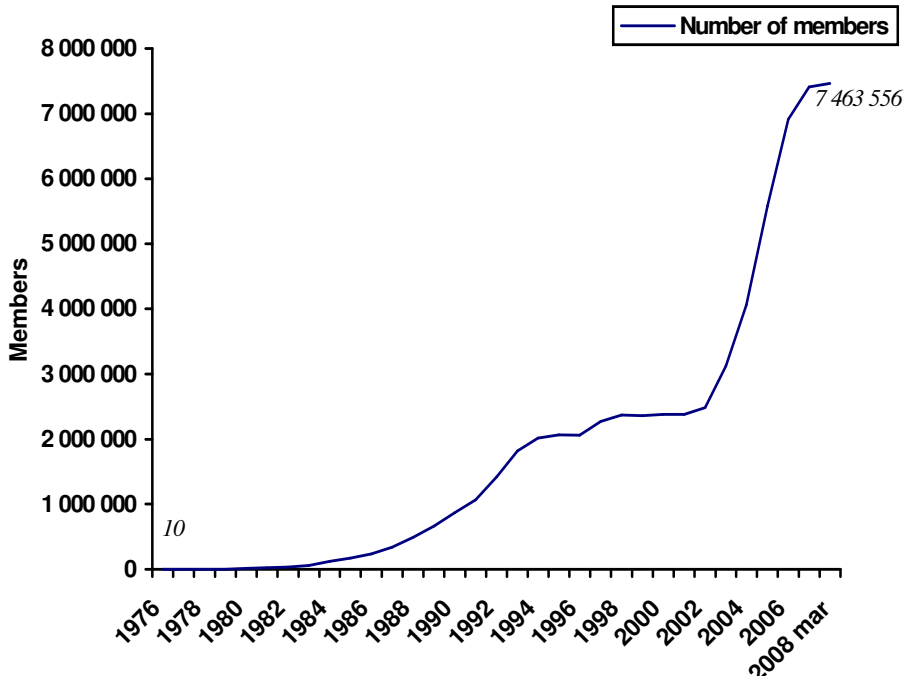
Bangladesh became independent from Pakistan in 1971. Over 80 % of the population were reported living in poverty in 1973-1974 (Morduch, 2005). Population suffers not only from famine, but also from shark moneylenders charging 10% interest a week. Professor Mohammed Yunus decides to start a radical experiment. One of his students makes a list with total of 42 people from a nearby village of Jobra that need totally less than 27 US$ to start for themselves (Grameen, 2008). Mohammed Yunus borrows his own money to the villagers. Not only are they able to improve their situation and start business, but they also repay well. Later Mohammed Yunus managed to get a loan and started to provide small loans to villagers. They were not given as a big sum, but as frequent small amounts. Grameen bank (Grameen = village) opened its official entity in 1983.

One of the innovations of Grameen Bank is group lending. Clients are organized in groups of 5. First only 2 members of the group get a credit, after that is repaid – the next 2 and the last 5th person at the end. The system encourages social responsibility by letting the whole group be responsible for all members. Failing to repay by one of the members excludes the whole group from future borrowing.

Mohammed Yunus noticed very fast that most of bank's clients were women. They were the ones spending more on family and business than for personal wishes. There was however a challenge – in Muslim culture women were kept at home. Microcredit enabled women to get more power in making decisions at home and allowed them to handle money.

In my opinion, the success of Grameen Bank can easily be understood by looking at the membership growth. In 1976 there were only 10 members in the bank, while as of March 2008 the number reached 7 463 566 customers (out of which 96,8 % are women).

Figure 2.5 Membership Growth in Grameen Bank, 1976-march 2008



Source: Grameen, 2008.

Grameen Bank provides a complex of microfinance services such as loans (basic, flexible, educational, housing, etc), deposits, insurance and even scholarships. The number of outstanding loans is 559,79 million US$ and recovery rate is 98,22%. 81 574 villages have access to financial services through Grameen Bank according to Grameen monthly update, march 2008 (Grameen, 2008).

2.6. Nobel Peace Prize 2006

The Norwegian Nobel Prize Committee has awarded the Nobel Peace Prize for 2006 to Muhammad Yunus (Bangladesh) and his foundation - Grameen Bank (Dhaka, Bangladesh). The press release stated that:

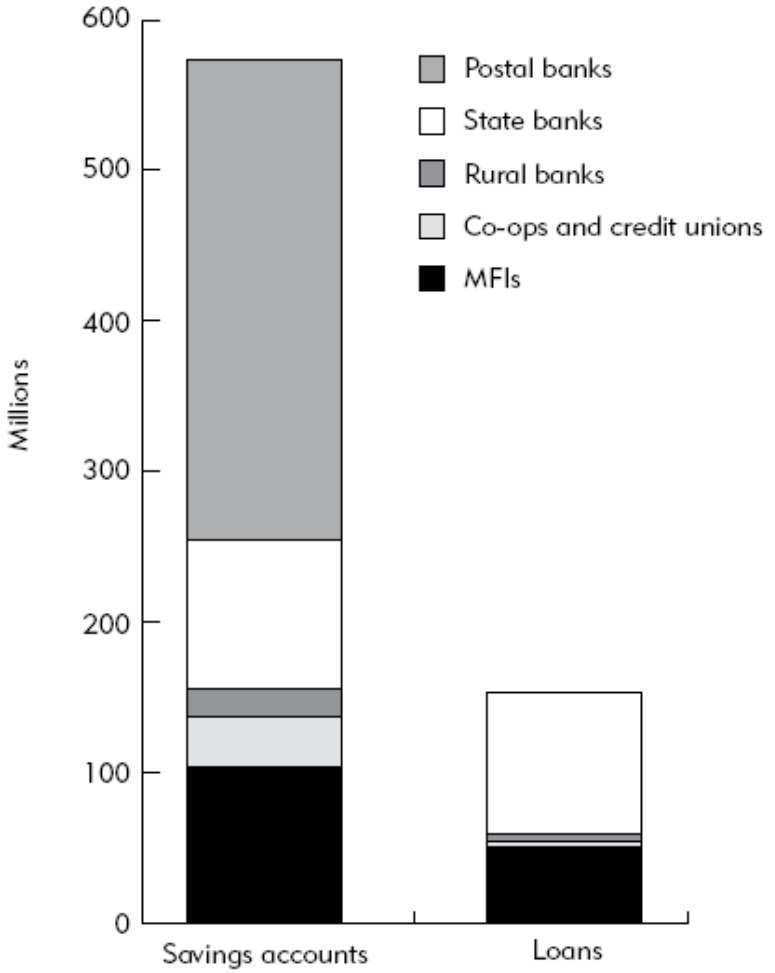
"Muhammad Yunus has shown himself to be a leader who has managed to translate visions into practical action for the benefit of millions of people, not only in Bangladesh, but also in many other countries. Loans to poor people without any financial security had appeared to be an impossible idea. From modest beginnings three decades ago, Yunus has, first and foremost through Grameen Bank, developed micro-credit into an ever more important instrument in the struggle against poverty." (Nobelprize, 2006).

In order to achieve lasting peace, we need to reduce poverty, continued the release. Though microfinance alone can't do it, it is proven to be an effective tool for the economic and social development.

2.7. Microfinance Today

As of 2004, almost 100 million people are loan client at MFIs (The Blue Book, 2006). The table below shows that these institutions provide around 600 million savings accounts and more than 150 million loans (The Blue Book, 2006). Postal banks account for more than a half of all savings accounts, while state banks and MFIs account for one fifth each. Rural banks, co-ops and credit unions share the remaining ~10%. Situation in loans is quite different. State banks and MFI are the main providers with respectively 62% and 33%.

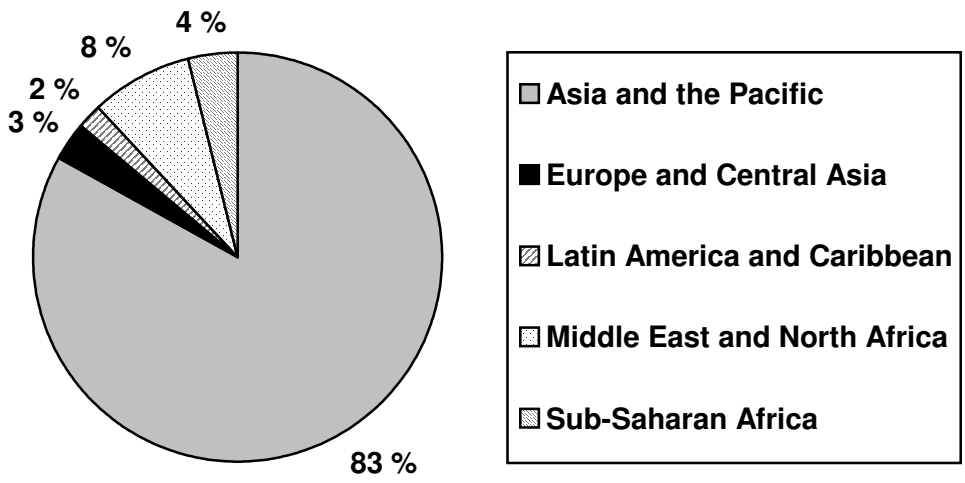
Figure 2.6. Alternative Financial Institution Activity in Developing Countries



Source: CGAP, The Blue Book, 2006

Now let's look how these loans and saving accounts are distributed geographically. Asia and the Pacific stand for 83% of all accounts, more than a half of these accounts is concentrated in China and India. Middle East and North America, Sub-Saharan Africa, Europe and Central Asia and Latin America and Caribbean account each for only 2-8%.

Figure 2.7 Accounts by Region



Source: Helms, 2006

CGAP (Helms, 2006) provides an interesting report on each of these regions. The report includes general characteristics of the microfinance sector, trends and some statistics. Microfinance sectors differ by focus (social or commercial), organization forms, loan size etc. I found it quite interesting that Asia had the lowest cost per borrower in the US$ - 50,0 compared to 176,1 in Latin America, 237.7 in Sub-Saharan Africa, 309,8 in Eastern Europe and Central Asia. The microfinance industry in the latter was characterized by higher loan sizes (due to higher income and education). Asia was characterized by strong social orientation.

Testing the empirical evidence, we will account for the possible effect of these regions in our model (chapter 10).

3. Providers of financial services

3.1. Informal

Many poor people can't access financial services from local banks because due to high costs or lack of collateral. For many of them family and friends become the most common provider of financial services. They can help you out in difficult situations but their resources are limited. Moneylenders have existed long in most of the societies. They know the locals and understand their situation. Though they can provide you with money when needed, their services can be very expensive. For example, poor farmers in India have no other alternative, then to get a loan from individual moneylenders at 100 percent interest rate (Mukherjee/Bloomberg, 2008).

Pawnbrokers, saving collectors, traders, clubs like ROSCAs and ASCAs are other sources of financial sources. Most of us are familiar with pawnbrokers, they offer loans in exchange for valuable items. Saving collectors provide a safe hiding place for you money. But instead of paying the clients interest rate (like commercial banks do), they charge them interest rates for keeping their money safe. According to CGAP (Helms, 2006) these fees can be up to 30 percent annualized interest rate in India. Traders and input suppliers are common loan providers for farmers. They offer fertilizers, seeds, money in exchange for repayment after crops (Helms, 2006).

ROSCAs (rotating savings and credit association) consist of group of people who gather in order to borrow and save together. They usually consist of 10-30 members who save regularly over a period of time together. The money is then distributed between the members, so that each participant gets a loan during the lifetime of a group. ASCAs (accumulating savings and credit associations) offer more flexibility to its clients, but require more management in return. These two types of groups are simple, efficient and transparent, but have a major drawback: cheating. Roy Mersland (Mersland, 2007) during his presentation on ROSCAs informed that more than 95 percent of participants have experienced losses. Among other problems he pointed out inflexibility, elite capture and exclusion of vulnerable members.

3.2. Member-based

These consist of Self-Help Groups, FSAs (financial service associations), CVECAs (Self-Managed Village Savings and Credit Banks) and financial cooperatives (Helms, 2006). Self-Help Groups is the most common form of microfinance in India (Nair, 2005). They are similar to ROSCAs and ASCAs, but these groups are also eligible for bank loans, which they lend further to their members. Self-help groups reach poorer people and more remote rural areas, as well as they have low cost of establishment, but these groups are very fragile (Mersland, 2007). FSAs and CVECAs are other hybrid models of member-based groups that are used in Africa.

Financial cooperatives offer financial services to their member and are usually ran as non-profit organizations. Studies show that member of credit unions account for 72 percent of borrowers and 86 percent of depositors in Central Asia (Helms, 2006). It is hard to measure whether financial cooperatives reach poorer clients compared to MFIs, but in order to be successful they need to be small enough to monitor the members and big enough to ensure that no single group dominates (Helms, 2006).

3.3. NGOs

NGOs have evolved as an answer to banks that failed to reach poor clients. The Nobel Prize Winner 2006 Grameen Money Bank is probably the most well known NGO example (presented earlier). It provides services to almost 7,5 million clients in 81 574 villages in Bangladesh. (Grameen, 2008). During the last decade, many MFI transform into regulated financial institutions (The Blue Book, 2006). Since many NGOs depend on donor funding, this would enable them to access more funds and be more efficient. This issue will be discussed in the next chapter.

3.4. Formal Financial Institutions

These are profit driven institutions that offer a wide range of financial services to their clients. Since they don't specially target the poor, they don't tend to reach them. The answer can lie in

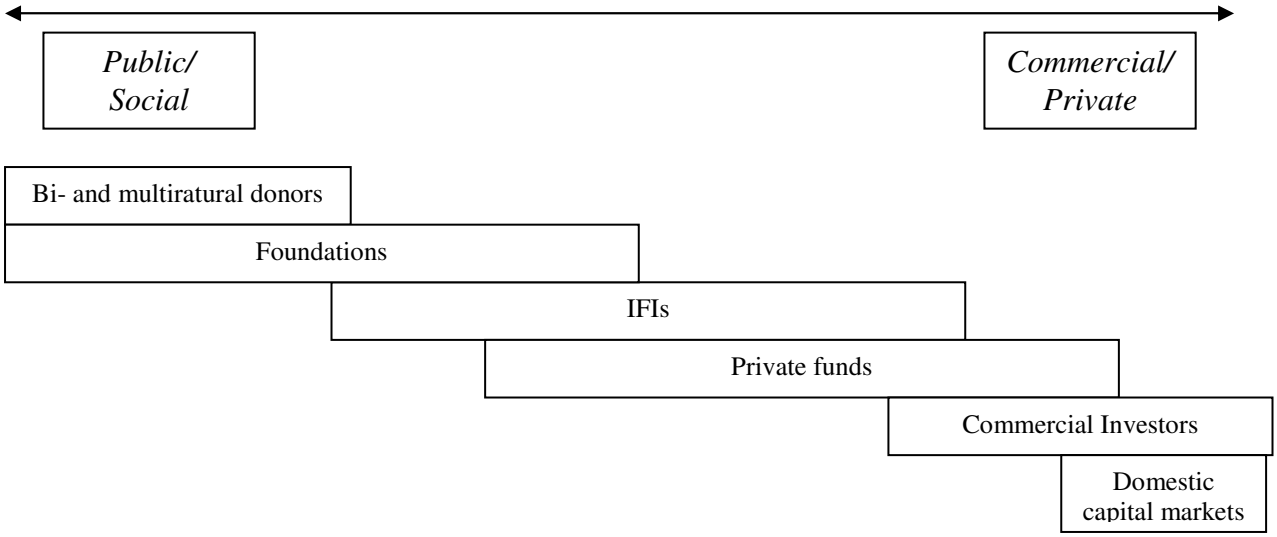
unsuitable products, high costs or lack of collateral. Among formal providers of financial services are different types of banks (state, commercial, rural or community) and non-bank financial institutions are. They are profit driven, and may prioritize their financial goals before social ones. (Helms, 2006).

Mersland conducted a study on the cost of ownership in MFI and found no support to promote for profit institutions at the expense of non-profit ones (Mersland, 2007). A study on MFI efficiency (Gutierrez-Nieto, Serrano-Cinca, Mar Molinero, 2007) finds that NGO status was related to the MFI efficiency. The issue between access to funds and the institution type will be discussed more in the next chapter.

4. Funding Options

In order to provide financial services MFIs need funds. The range of funding options for microfinance stretches from bi- and multilateral donors to commercial investors and domestic capital markets. The first ones put more focus on social objectives (welfarists) of the MFI while the latter (institutionalists) are more concerned with commercial motivations.

Figure 4.1. The Landscape of Funding Options of Microfinance



Note: IFI = international financial institutions

Source: Helms, 2006

The MicroBanking Bulletin provides MFI benchmark tables. The study of 200 MFI in 2003-2005 shows that the number of financially sustainable MFI has changed from 126 MFI in 2003 (63%) to 141 in 2004 (70,5%) and to 142 in 2005 (71%) (MicroBanking Bulletin, 2007). Though many MFI have proven that it is possible to provide financial services to the poor and make money, there are still others who wouldn't survive without subsidies.

Testing the research model, we'll account for possible effects of profit and non-profit motivation of MFIs.

4.1. Donors

The role of donors has been widely discussed in the microfinance literature. Inefficient and badly organized programs can do more harm than good. Such was the evidence in the Philippines where heavy subsidies designed to provide access for poor borrowers ended up in the hands of favored residents and only worsened income distribution. India's Integrated Rural Development Program (IRDP) is another example of inefficient subsidized credit. The program failed due to very low rates, which led to low repayment rates and bad institutional performance (Morduch, 2005).

Another study suggests that in order to break even without subsidies in 1985-1996 Grameen Bank would have to increase it's lending rates by 75% (Morduch, 2005).

Liza Valenzuela (ACCION, 2002) studies two questions. What kind of commercial institutions should donors support (advantages and disadvantages by peer groups: large commercial banks, small banks, state banks, finance companies, and strategic alliances) and what kind support is the most appropriate (loan funds, guarantee funds, technical assistance and operating expense support). The survey showed that some institutional types might have a slight advantage in regards to special objectives (ex. large banks reach the most poorest clients for the least investment, small bank reach the most poorest clients, while state banks and finance companies reach the highest number of clients). Technical assistance showed to be the most fruitful of donor interventions. The author argues that there is clearly a role for donors in advancing downscaling efforts.

Main concerns are that by having access to cheap financial funds, MFI are not motivated to achieve full financial self-sufficiency and may adjust their programs to please donors. Morduch (Morduch, 2005) suggests to use "smart subsidies". This means subsidies during start-up phase of the MFIs, loans that target poorest customers who can't afford to borrow at market rates or subsidize the cost of small loans since they are more costly pr $ lent.

4.2. Investors

With time many MFIs expand and need to mobilize more funds.

Most of the foreign investments (almost 90%) concentrate on 2 regions: ECA (46%) and LAC (42%). While private investors have invested mostly in LAC, public investors chose to invest in ECA. Unfortunately, investors tend to compete for well-established regulated MFI regions leaving doubts to whether sufficient market opportunities exist for small funds (CGAP, 2004).

Figure 4.2. Disbursed Foreign Investment (in US$ millions)

	All Investors	
Region	**Total $**	**Total %**
Eastern Europe and Central Asia (ECA)	502,2	46
Latin America and Caribbean (LAC)	457,9	42
Sub-Saharan Africa (AFR)	62,9	6
East Asia and the Pacific (EAP)	35,7	3
South Asia (SA)	29	3
Middle East and the North America (MENA)	8,8	1
TOTAL	**1096,5**	**100**

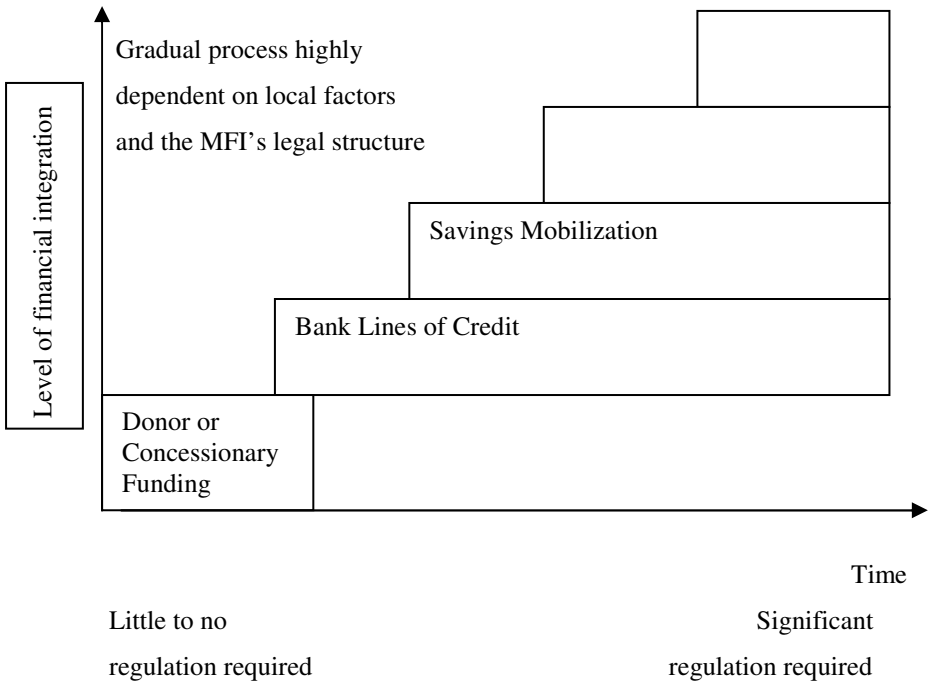
Source: CGAP (2004)

Foreign investments have some downsides. MFI can experience problems coping with foreign exchange risks. The other problem that might arise is conflict of interests since investors can offer both technical assistance and investments (Helms, 2006). Financial experience, good management and negotiating power will help to deal with these risks.

4.3. Domestic Capital Markets

The final stages of financial integration (SWWB, 2004) developed by Women's World Banking lies in domestic funding markets. To access these funds MFI highly depend on local factors, MFI's legal structure, require significant regulation and also time.

Figure 4.3. Stages of Financial Integration



Source: SWWB, 2004

Many MFI work in developing countries with small financial sectors. Small economies of scales result in higher transaction costs. Access to financial markets is therefore limited and more expensive (The Blue Book, 2006).

Another problem lies on the institutional level. Weak operational capacity and management, lack of transparency, governance structure and limited ability to manage risk often characterize MFIs (The Blue Book, 2006). Thus investing in MFI might simply be too risky.

There are a couple of interesting issues I came along studying the area:

1) Lending to MFIs can lower bank's ratings due to uncollateralized portfolios (The Blue Book, 2006)
2) Banks fear criticism for giving loans at high interests rates to the poor (The Blue Book, 2006)

More attention should be given to these problems. Banks should not fear that lending to the MFI may harm their reputation.

Savings mobilization is another source of funding. One of its strengths is independence from external funding. Low cost over time is another advantage (Helms, 2006). Savings mobilization requires higher level of integration and regulation. Microfinance industry suffers from the lack of transparency. Clients need reliable information in order to deposit their money. On the other side, many MFIs are non-regulated and are not allowed by government regulations to take deposits from clients.

Bonds issue allows the MFI to access funds from the domestic capital markets. As we see in our figure, this method is a gradual process that requires a high level of integration. Therefore it is not very common. Increased transparency would benefit MFIs in getting funds and local investors in making investments decisions.

Equity markets require the highest level of regulation and financial integration. I won't go further into it. Local investors and MFI would benefit from higher transparency.

5. Microfinance Rating

5.1. Credit Risk Ratings?

Credit risk ratings date back to 1900s when John Moody&Company published its first manual with "information and statistics on stocks and bonds". The use of ratings has grown and two decades later Moody's rated almost all of the US bonds (Moodys, 2008).

Credit risk ratings provide information on credit worthiness of a company and the ability to meet its debt obligations. Based on fundamental credit analysis a rating agency gives a grade from highest credit quality to the lowest (Rating Fund, 2008).

Rating reports are useful to investors and companies as well as securities or governments being rated. While they use their rating reports to facilitate investments, investors use reports to decide what kind of risk they are willing to take and whether they want to invest (Investorpedia, 2008). Moody's, Standard and Poors and Fitch IBCA are the leading rating agencies in the investment world.

5.2. Microfinance Ratings

Though MFI existed since 1970's, the first MFI specialized rating agency did not appear until two decades later. There are two main types of microfinance ratings: credit risk ratings and global risk assessments (also known as performance assessments). As mentioned above, credit risk ratings focus on creditworthiness and the ability of an MFI to meet its financial commitments.

Global risk assessments "put more weight on operational elements such as appropriateness of lending methodologies and governance issues and allow comparability mainly to other MFIs". (Navajas, Suaznabar, 2006).

Microfinance Rating Market Outlook (Rating Fund, 2006) published by CGAP provides a comparison of credit risk ratings and global risk assessments by regions.

Table 5.l. Global risk assessments and credit risk ratings by region, 2006

Region	Global risk assessments	Credit risk ratings
LAC	83	125 (47 mandatory)
Asia	108	3 (2 mandatory)
SSA	30	0
EECA	37	0
MENA	17	0
Total	275	128 (49 mandatory)

[a] Mandatory risk ratings include multiple ratings of the same MFI in one year.

Source: Rating Fund, 2006

From the table above we can see that over half of all microfinance ratings in 2006 were conducted in LAC (30% of all global risk assessments and 98% of all credit risk ratings). This is consequent with the facts that Latin American microfinance market is mature and was the first one to start using microfinance ratings.

Though global risk assessments are created to fit the purposes of MFI, credit risk ratings dominate the region (60% of all ratings). This can be partly explained by the fact that some Latin America countries have mandatory regulations for MFI. For example in Bolivia (36 out of 47 mandatory ratings in LAC were done there) MFI that want to be regulated by the superintendent of banks must be rated by an authorized rating agency (Rating Fund, 2006).

Asia is the second largest market for ratings (28%) and the largest market for global risk assessments (39%). In 1994-2005 India was the leading country in the region accounting for 79% of credit risk ratings and global risk assessments performed (Rating Fund, 2006). SSA, EECA and MENA rating markets are smaller and represent respectively 11%, 13% and 6% of all global assessments and none of the credit risk ratings.

Let's take a look at the microfinance rating market today (table 5.2). Though microfinance rating industry is quite young, it has evolved and expanded during the last years. 1809 ratings and assessments have been completed in the period 1997-2006. Not only has the demand for new ratings grown, but also so has the demand for repeat ratings and assessments. This means that organizations that have been rated before found rating useful and wanted to update their rating.

Table 5.2. Microfinance rating industry overview

	1997–2006	**2005**	**2006**
Total number of ratings and assessments completed	1,809	327	403
First-time ratings or assessments	721	109	165
Repeat ratings or assessments	1,088	218	238
Global risk assessments	1,188	217	275
Credit risk ratings	621	110	128
Mandatory credit risk ratings	314	44	48
Proportion of Rating Fund co-financed ratings	NA[5]	22%	24%

Source: Rating Fund, 2006

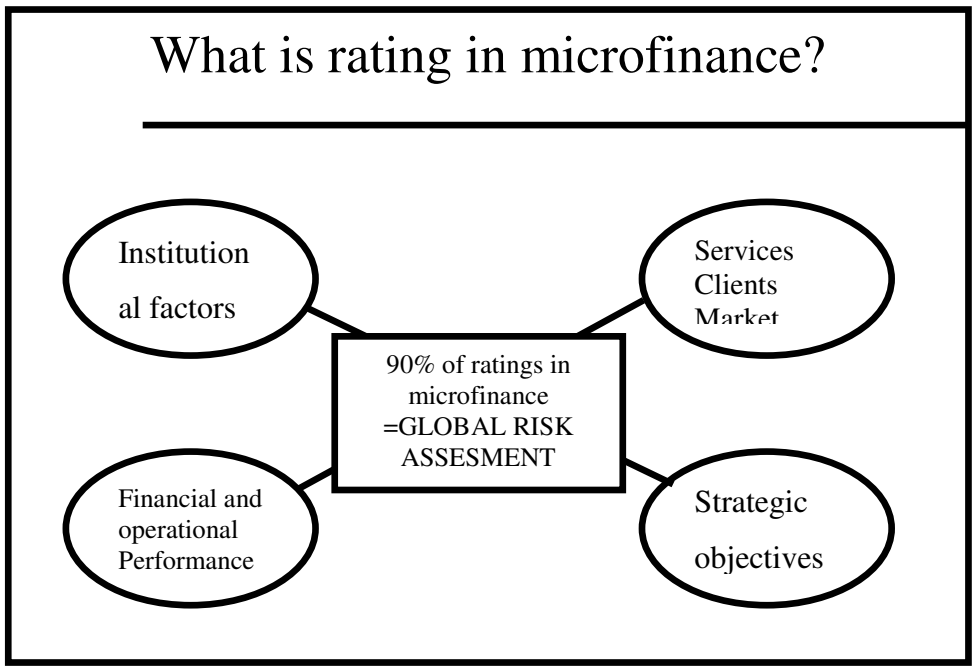
Global risk assessments dominate with 66% out of total ratings and assessments completed, leaving 34% to credit risk ratings (right above half of which where mandatory).

Though many MFI might find the ratings very expensive, the MFI can get their ratings co-financed. 22% of ratings in 2005 and 24% of ratings in 2006 were co-financed by the Rating Fund, an organization created to stimulate the demand for MFI ratings/assessments and improve transparency. These issues will be addressed more closely later in the paper.

Rating agencies are independent suppliers of microfinance rating services. They have developed their own rating methodologies that differ between the agencies. Though some

agencies put more weight on some factors compared to the others, the process of a rating consists of the following analysis:

Figure 5.1. Microfinance Rating



Source: Rating Fund, 2006

A rating agency starts by studying qualitative aspects such as institutional factors, services, clients and the market. It looks at the organization, its history, form of governance, staff etc. Then the agency studies clients, services provided (their quality and portfolio quality) and the market itself.

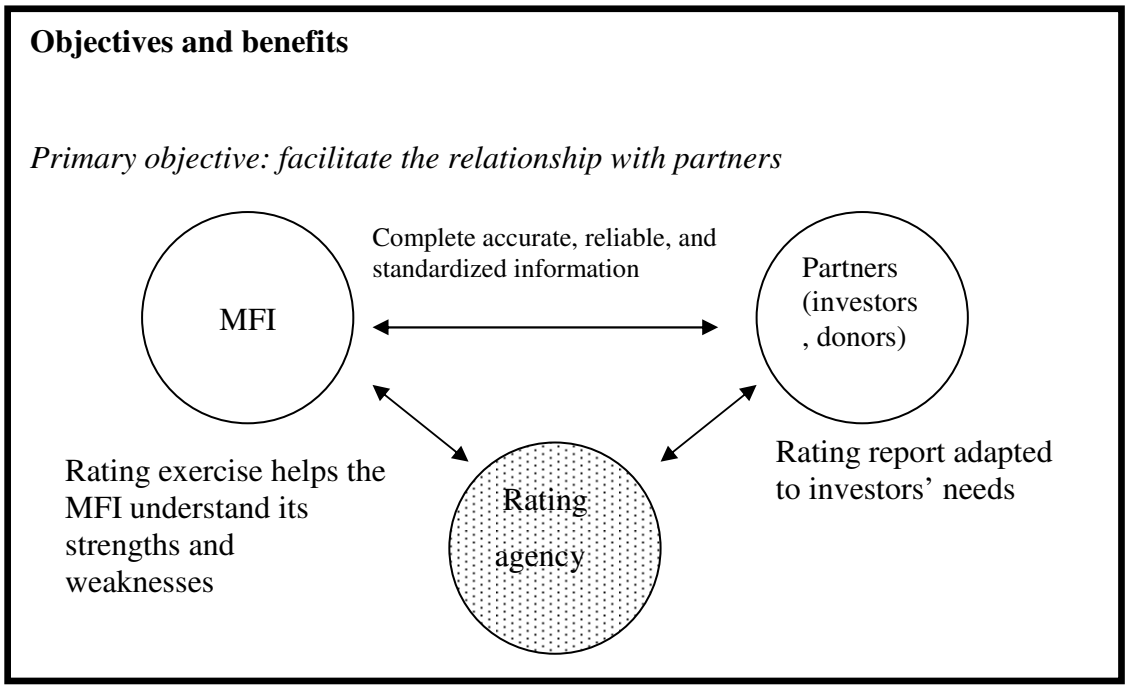
The next part is the analysis of quantitative factors. Such analysis of financial and operational performance helps the raters to study risks, financing strategy, profitability and efficiency.

Finally the agency compares the strategic positioning with the objectives. The raters also look at the market and trends. This type of analysis enables comparison of the MFI within peers and the industry.

Objectives and benefits

The Rating Fund states that the primary objective of MFI ratings is to facilitate the relationship with partners.

Figure 5.2. Objectives and Benefits of Ratings



Source: Rating Fund, 2006

Investors might be reluctant to invest in MFI if they don't get complete, accurate, reliable and standardized information. Some countries (in Latin America and Asia) require mandatory rating for MFI fulfilling special requirements.

On the other hand a rating helps the MFI to understand its strengths and weaknesses.

Figure 5.3. Benefits of Ratings

The benefits of ratings for MFIs	
Improving Performance	**Attracting Funders**
Managers can use the evaluating process to: • focus on how and where to improve • compare their performance with peers • evaluate their standing in the microfinans industry and set performance targets	Thir party verification of MFI performance information and risk management assessment allows: • Investors and donors to judge the relative quality of MFIs • MFIs to earn higher transparency ranking on the MIX Market, which links investors with MFIs

Source: Rating Fund, 2006

Ratings help MFI to improve their performance. Learning about its strengths and weaknesses will help the management to focus on the right aspects, set long-term goals and address its problem areas.

MFI can compare their performance with peers and the microfinance industry. This can serve as an incentive to improve or can help the MFI to benchmark.

Another benefit of rating is to attract funds. Investors and donors require reliable information on the MFI performance in order to decide whether to place their money in the MFI. Originally MFI ratings were done to satisfy the donors needs. They put more weight on how funds are used on special projects and not the institution's (Rating Fund, 2006). In other words, donors focus more on social objectives and outreach (Gutierre-Nieto, Serrano-Cinca, 2007).

Investors are more concerned with sustainability. They focus more on financial performance and are looking for profitable "social" investments (Rating Fund, 2006).

All ratings co-sponsored by the Rating Fund are public. Though ratings can be used to attract funds, many MFI are afraid that a negative rating can do the opposite. Before doing a public rating, MFI can use an external source to evaluate them first. This can be an effective way to improve the weaknesses, the insiders (managers, staff) might oversee.

5.3. Microfinance Rating Agencies

The microfinance rating market is represented by 15 suppliers of rating services. These agencies can be divided into the following categories: specialized agencies; regionally or single-country based agencies that rate financial organizations and mainstream credit risk rating agencies (Rating Fund, 2008). They provide global risk assessments, credit risk rating or both. Table 5.3 provides an overview of five major MFI rating agencies: MicroRate, Planet Rating, Microfinanza, Crisil and M-Cril. Information for the table is gathered from agencies' websites and the Rating Fund.

All rating agencies are experienced raters that performed from 180 to 420 ratings. If we take a look at geographical coverage, all of them operate globally except for Crisil that performs ratings in India. These five agencies use both quantitative and qualitative analysis in performing ratings. Planet Rating, Microfinanza and M-Cril value quantitative and qualitative analysis similarly (40% and 60%). Crisil bases its ratings slightly more on quantitative analysis 45% (thus 65% on qualitative). MicroRate uses qualitative analysis the most compared to the other four agencies (70%).

An insight into agencies' methodology shows that they are not the same. Each agency uses its own rating methodology. They include more or less the same aspects and cover institution, its risk and financial performance, management, governance. Studies of microfinance methodologies (Jardosh 2007, Xavier 2002) show that even if microfinance use the same indicators, they may define them differently. Both researchers come to a conclusion that a standardized rating system is needed. Another difference is the rating scale. All rating agencies use their own rating scale. Use of standardized rating scales would make comparison between MFIs easier.

Table 5.4. Rating Agencies Description

Agency	Number of ratings performed	Geographical coverage	Natura of overall analysis	Methodology	Rating scale
MicroRate	280	Africa, MENA, CEE/NIS, Latin America	Quantitative 30%, qualitative 70%	Financial profile, operational performance, portfolio quality, management&organization, governance&strategic positioning	α++, α+, α, α-, β+, β, β-, γ+, γ, γ-
Planet Rating	180	Africa, MENA, CEE/NIS, Latin America, South Asia, EastAsia&the Pacific	Quantitative 40%, qualitative 60%	GIRAFE: governance, information, risk management, activities, financing&liquidity, efficiency&profitability	A+, A, A-, B+, B, B-, C+, C, C-, D, E
Microfinanza	210	Africa, MENA, CEE/NIS, Latin America, South Asia, EastAsia&the Pacific	Quantitative 40%, qualitative 60%	External environment&competitive positioning, governance&operations, financial products, assets structure&quality, financial structure&asset liability management, operational&financial results, strategy&financial needs	AAA, AA, A, BBB, BB, B, CCC, CC, C, D
Crisil	400	South Asia	Quantitative 45%, qualitative 55%	MICROS: management analysis, institutional arrangement, capital adequacy&asset quality, resources, operational effectiveness, scalability&sustainability	mfR1, mfR2, mfR3, mfR4, mfR5, mfR6, mfR7, mfR8
M-Cril	420	CEE/NIS, South Asia, East Asia&the Pacific	Quantitative 51%, qualitative 49%	Governance and strategy, management systems, financial performance	α+++, α++, α+, α, α-, β+, β, β-, γ+, γ

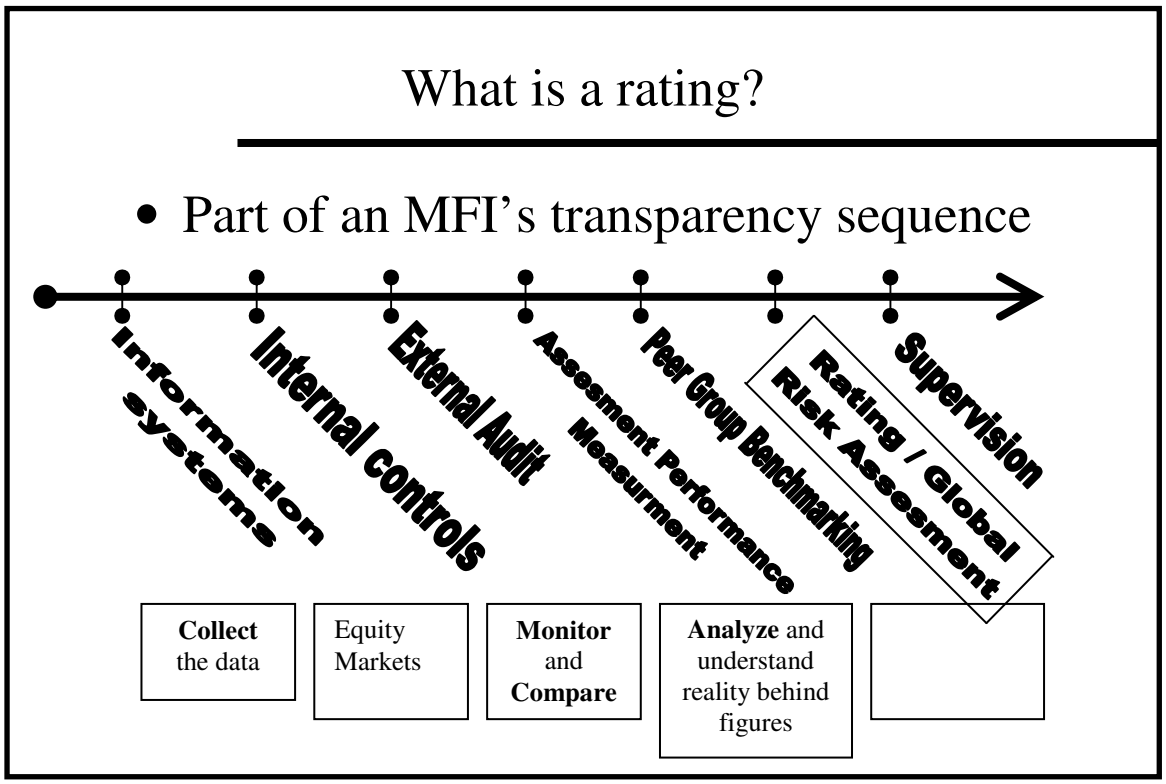
6. Theory

6.1. Transparency

According to CGAP, ”transparency is essential if the microfinance industry is to reach scale.” (CGAP, 2008). Transparency has two goals: improved MFI performance and commercialization of microfinance. Information on MFI’s performance and comparison with peers motives the management to deal with the weaknesses and improve performance. The latter can be achieved by providing accurate and reliable information to the funders (CGAP, 2001).

Ratings are a part of an MFI’s transparency sequence:

Figure 6.1. What Is A Rating?



Source: The Rating Fund, 2006

MFI starts the transparency sequence by using information systems to collect the data. First the data's integrity is verified within the MFI through internal controls, and then outside the organization through external audit.
Assessments and microfinance ratings help to monitor, compare, analyze and understand the gathered information. The MFI can be studied not only based on its own performance, but can also be compared to other actors in the industry and can benchmark itself. Further governments or other authorities can use these reports for supervision purposes. (CGAP, 2001).

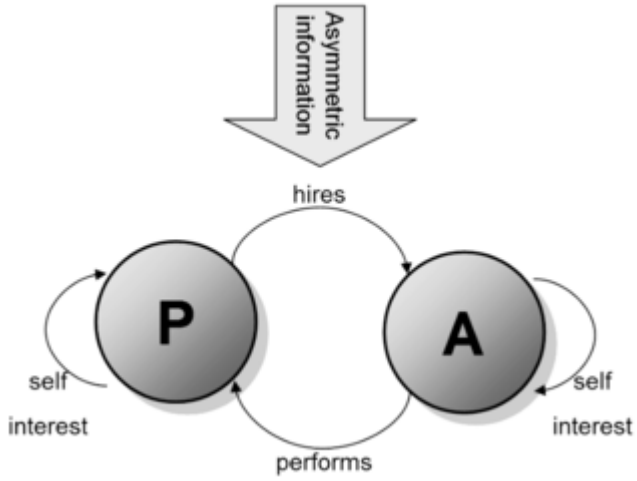
Accurate and reliable information would benefit all parties. The MFI would be able to identify their weaknesses and deal with them. Clients would benefit from knowing about financial performance of MFIs. This would give them a clue to whether the MFI is risky and could have troubles in meeting its obligations. Investing in a risky MFI could be a threat towards deposit's safety. (Rating Fund, 2006) Some donors and funders can be reluctant about investing in unrated MFIs. Transparency would help them to find organizations according to their risk profiles.

Mixmarket is a microfinance information platform. It aims to promote transparency. Information on MFIs, investors, raters, agencies and advisory firms can be find there. Mixmarket publishes information on MFIs, investors, raters, advisory firms etc. (Mixmarket, 2008). Among other promoters of transparency is the Rating Fund. It does so by co-funding rating of the MFI. As a part of the deal, these ratings are available to public through their website (Rating Fund, 2008).

6.2. Agent theory

Now let's use the agent theory on the case with MFIs. Agency relationship occurs when one party acts on behalf of another. The principal-agent problem assumes that the agent has an informational advantage over the principal. The principal compensates the agent to work on his behalf, but he is not sure whether the agent advances principal's goals (Milgrom, 1992). A graphical representation can be found below:

Figure 6.2. Principal-Agent Problem



Source: Wikipedia, 2008

We can use this model in microfinance on a relationship between donors (principals) and MFI managers (agents). Donor provides a subsidy and of course wants the money to be used in a best possible way. Manager might have different interests. Since many MFI are unregulated and unsupervised, donors can suffer from moral hazard. Microfinance ratings would improve the availability of information and reduce information assymetry.

7. Previous studies

7.1. Bond ratings

Horrigan 1966

Horrigan was the first one to predict bond ratings. He used regression analysis to find independent variables for his equation. Those ratios that had the highest R^2 and most significant *t*-statistics were chosen. (Kaplan and Urwitz, 1975). The final independent variables used for the study were: subordination, total assets, ratios of working capital over sales, net worth over total debt and sales over net worth and net operating profit over sales (Ang and Patel, 1975). Horrigan's model could predict 58% of Moody's ratings and 52% of Standard & Poor's ratings.

West 1970

West believed that ratings were highly correlated to risk premiums (Ang and Patel, 1975). He took another approach and chose determinants of risk premiums from Fisher's study as variables for the model and not financial ratios as Horrigan. West used four independent variables: earnings variability, period of solvency, equity to debt ratio and bonds outstanding. The model could predict 62% of Moody's ratings.

Pogue and Soldofsky 1969

Pogue and Soldofsky developed a regression model based again on the financial ratios. They identified five independent variables for their study: long-term debt to total assets, net income to total assets, coefficient of variation of earnings, total assets and interest over interest charge. The model could predict 80% of Moody's ratings (Ang and Patel, 1975)..

Pinches and Mingo 1973 and 1975

Pinches and Mingo used multiple discriminant analysis (MDA) to predict bond ratings. The model was based on subordination, size, leverage, long-term and short-term capital intensity,

return on investment, earnings stability and debt coverage as main determinants of ratings. This model correctly predicted 60% of new ratings.
A follow up study was performed 2 years later and the model predicted correctly 75% of new ratings (source: Ang and Patel, 1975).

Kaplan and Urwitz 1979

Kaplan and Urwitz used probit analysis based on financial ratios and risk measures such as interest coverage ratios, capitalization (leverage) ratios, profitability ratio, size variables, stability variables and a dummy variable that represented subordination status. The model could predict 69% of new ratings (Ang and Patel, 1975).

Belkaoui 1980

Belakoui used an MDA model including eight independent variables – namely, total assets, total debt, long-term debt to total capitalization, short-term debt to total capitalization, current ratio, fixed charge coverage ratio, stock price to common equity per share and subordination status (Hyunjoon and Zheng, 2004).

7.2. Microfinance ratings

Hartarska 2005

Since ratings in microfinance are still rather new, only a few studies were done on rating of MFI. The study of Valentina Hartarska suggests that rating may have a potential to impose market discipline in microfinance, but not all microfinance rating agencies are the same (Hartarska, 2005).

Gutierrez-Nieto, Serrano-Cinca and Mar Molinero 2005

Gutierrez-Nieto, Serrano-Cinca and Mar Molinero used Data Envelopment Analysis to measure the efficiency of MFI's (Gutierrez-Nieto, Serrano-Cinca, Mar Molinero, 2005). The results of the study showed that MFIs efficiency could be explained by four principal

components (overall measure of efficiency, NGO status, input choice and output choice). Organization type (NGO or non-NGO) and country had also effects on efficiency.

Rosenberg 2005

Rosenberg (Rosenberg, 2005) studied core performance indicators in microfinance. He identified five minimum financial performance indicators for retail financial institutions. Those are: outreach, depth of outreach, portfolio quality, financial sustainability and efficiency.

Gutierrez-Nieto and Serrano-Cinca 2007

Gutierrez-Nieto and Serrano-Cinca studied determinants of MFI ratings. Their research was based on 70 MFI ratings completed by one rating agency - Planet Rating. Factors explaining MFI rating were size, profitability, efficiency, risk and social performance of MFIs. As assumed, the results of the study showed positive and significant relationships on rating of size, profitability, efficiency of MFI and a negative and significant relationship of risk of MFI. However no relationship was found between social performance of MFI and rating assigned (Gutierrez-Nieto and Serrano-Cinca, 2007)

8. Hypotheses

Hypothesis is a statement that explains certain facts or phenomena. Hypothesis consists of a null hypothesis (H_0) and an alternative hypothesis (H_1). A null hypothesis states that any effect we state or explain is due to random error (Zikmund 2003, p.44). In this study null hypotheses will state that there is no relationship between MFI rating grade and size, risk, productivity, efficiency, profitability and social performance of MFI. An alternative hypothesis is the opposite of a null hypothesis. In our case hypotheses will state that there is a relationship between those variables and will indicate their direction (positive or negative).

Hypothesis testing will help us to find which of the two hypotheses is true. If stated relationship exists, then we will reject the null hypothesis and accept the alternative hypothesis. If the relationship will not be found to be true, we will accept the null hypothesis and reject the alternative hypothesis. The procedure of hypothesis testing will be described more in chapter 11.

Theory and earlier observations will help us to determine our hypotheses. In the previous studies on bond ratings financial ratios and risk measures were used as main determinants of ratings. In general, the variables that had the highest explanatory power were subordination status, size, earnings stability, leverage, earnings coverage of interest and profitability. (source: Kaplan&Urwitz, Statistical models of bond ratings, p. 242). These models could correctly predict 60-80% of ratings.

Hartarska (Hartarska, 2005) states that microfinance ratings may help to impose market discipline. Gutierrez-Nieto and Serrano-Cinca (Gutierrez-Nieto and Serrano-Cinca, 2007) study determinants of MFI ratings and constitute that MFI size, risk, profitability, efficiency and productivity effect the rating grades. Gutierrez-Nieto, Serrano-Cinca and Mar Molinero (Gutierrez-Nieto, Serrano-Cinca and Mar Molinero, 2005) find that NGO-status of MFI and the country they operate in effects efficiency.

Table 9.1. Hypotheses

Variable	Hypotheses
Size	+
Risk	-
Efficiency and productivity	+
Profitability	+
Social performance	+

8.1. Hypothesis 1: Size

Previous studies on bond ratings by Horrigan (1966), Pogue and Soldofsky (1969), Pinches and Mingo (1973 and 1975), Kaplan and Urwitz (1979) and Belkaoui (1980) as well as study on MFI ratings by Gutierrez-Nieto and Serrano-Cinca (2007) included variables measuring size as determinants of ratings.
Larger MFI should benefit from economies of scales. They are usually better in paying their obligations. Larger MFI can adjust better to economical and political changes. Therefore the first hypothesis is:

$H_1$0: There is no relationship between MFI size and the rating grade.
H_1A: A positive and significant relationship exists between MFI size and the rating grade.

8.2. Hypothesis 2: Risk

Rating assesses creditworthiness of MFI. A poor rating indicates a higher risk, and thus leads investors to require higher interest rates in return. (Wikipedia, 2008; Gutierrez-Nieto & Serrano-Cinca, 2007) included risk measures in their studies on ratings. The second hypothesis is the following:

$H_2$0: There is no relationship between MFI risk and the rating grade.
H_2A: A negative and significant relationship exists between MFI risk and the rating grade.

8.3. Hypothesis 3: Efficiency and Productivity

"Efficiency and productivity are performance measures that show how well the institution is streamlining its operations" (MicroRate). Productivity refers to measures of output pr unit of input. Efficiency goes further and compares production with cost.
Most of the previous studies on ratings described earlier include these financial ratios in their models (see chapter 7). The third hypothesis is:

H_30: There is no relationship between MFI efficiency and productivity and the rating grade.
H_3A: A positive and significant relationship exists between MFI efficiency and productivity and the rating grade.

8.4. Hypothesis 4: Profitability

Profitability compares performance in all areas of MFI. The review of previous studies on ratings very often includes profitability measures as independent variables in their research (see chapter 7). Therefore we expect profitable MFI to be better in meeting their obligations, and thus acquire higher rating. The fifth hypothesis is as follows:

H_40: There is no relationship between MFI profitability and the rating grade.
H_4A: A positive and significant relationship exists between MFI profitability and the rating grade.

8.5. Hypothesis 5: Social performance

MFIs are organized both as for-profit and non-profit organizations. Therefore MFI include some unique features since they can be compared both with financial institutions and NGOs. When funding MFIs, donors put more focus on outreach, while investors – on sustainability. According to CGAP (Helmst, 2006) all international investors in microfinance "are willing to accept a more modest return on their investments in exchange for the social returns generated by microfinance". More outreach often means less sustainability and more risk, thus poorer financial performance, which should lead to lower rating. But due to unique nature of MFIs (they carry social objectives and missions), a special attention should be given to social performance during the rating process.

Some studies found a positive relationship between social performance and company performance, while Gutierrez-Nieto and Serrano-Cinca (2007) found no relationship between financial and social performance of MFIs.

All rating agencies have different methodologies. Some might put more weight on social indicators, while others - on financial. Besides all MFI rating agencies claim to evaluate MFIs on the institutional level and study its objectives and mission. In this study, rating reports from five different rating agencies will be used. I assume that social performance would be an important variable to explain the MFI rating grade. Therefore I assume the following hypothesis to be:

$H_5$0: There is no relationship between MFI social performance and the rating grade.
H_5A: A positive and significant relationship exists between MFI social performance and the rating grade.

9. Empirical Research

In this section we describe our empirical study. We start by describing how the data was collected. Then we regard the issue of reliability and validity. In section on data preparation we tell how information was checked for deviations, wrong entries and missing values. Since regression analysis assumes that the variables are normally distributed, some of the variables had to be transformed. We discuss data transformation and present the variables.

9.1. Data collection

For this study, global risk assessments from five major rating agencies were used. Since not all MFIs make their reports available for publicity, the reports available through the Microfinance Rating and Assessment Fund (later the Rating Fund) were chosen. It is a joint initiative started in 2001 between Inter-American Development Bank (IDB), the Consultative Group to Assist the Poor (CGAP) and joined in 2005 by the European Union. (Rating Fund, 2008). The main objectives of the Fund are:

1) Market-building for MFI rating and assessment services

2) Improved transparency of MFI financial performance

In order to do this, the Rating Fund co-finances rating services for MFIs. The rating reports that have received subsidies from the fund, are available online. More than 429 reports of MFIs worldwide are available to public through fund's website www.ratingfund.org.

For this study, only global risk assessments were used. They focus not only on creditworthiness, but analyze MFI's global performance (operational and financial, management's capability) (Rating Fund, 2008). Further, only rating reports by five major rating agencies, namely - Planet Rating, Microfinanza Srl, MicroRate, Crisil and M-Cril were chosen.

Working with rating reports done by different agencies is a challenge due to lack of standardization. Previous studies show (Jardosh; Reille, Sananikone & Helms) that microfinance rating agencies use different approaches and put more weight on different factors. This should, however, have only a minor influence on the database, since

"comparison of the methodologies applied by the rating agencies reveal no major differences in MFI assessment" (Mersland)..

Another challenge is that rating agencies use different rating scales. This problem was eliminated by converting rating scales used in the study into a uniform rating scale developed by Roy Mersland (Roy Mersland, Ph.D. student at Agder University).

After these selections, the final dataset contained 290 global risk assessments. The MFIs presented were evaluated between 2000 and 2007 and come from 60 different countries.
Roy Mersland (Roy Mersland, Ph.D. student at Agder University), developed the dataset and it was a big honor and pleasure to be working with him.

9.2. Reliability and Validity

In order to make a correct study we need to be sure that all data is reliable and valid. Reliability refers to the ability to provide consistent free from error results. The ability of a measure to measure what it's designed to measure is called validity (Zikmund, 2003). The data in our sample is collected from rating reports. The variables are either given in the report or calculated from MFI income statements. The calculations are based on standard financial formulas (ex. operating expense ratio, portfolio at risk). Other variables, like for example total assets are given in the income statements. This should mean that the scales provide a correct measure. Other variables, like for example total assets were given in the report. Since rating grades are transformed using a uniform rating scale, a control variable for agency is used in the model to control for possible effects.

9.3. Data Preparation

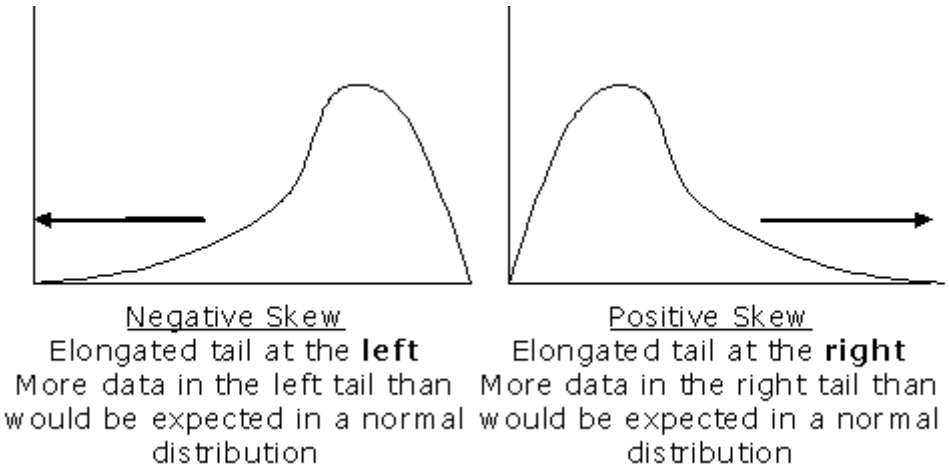
Descriptive statistics was used to check for outliers and wrong values. Minimum, maximum and mean values for each variable helped to check for deviations. A graph function in SPSS was used to build graphs with rating grade and each of the independent variables. All special cases were given attention. For example, variable portfolio at risk had 8 measures were the value was equal to 0. To make sure that none of this was due to a wrong entry, each variable

was checked in the rating reports. Variable average loan outstanding had an unusually high value for MFI Rural Finance Corporation. The value was found correct and was a good example for the model. Variables that were measured on nominal scales (ex. type, agency) were checked for wrong and missing values. The aim was to keep as many cases as possible in the dataset. Data transformation helped to deal with some outliers and high deviations. Cases with missing values were also excluded. Out of 248 cases the final sample included 229 cases after data preparation.

9.4. Data Transformation

The aim of this paper is to show the relationship between the MFI rating grade and MFI size, risk, profitability, social performance, efficiency and productivity. The model to test hypotheses uses multiple regression analysis. It allows analyzing the relationship between two or more independent variables on the dependent variable. Regression analysis requires the data to be normally distributed: linear, normal and homoscedastic (Wikipedia, 2008). If the variables aren't normally distributed, the problem can be solved by data transformation. It is used to transform data to a format that better supports data analysis (Zikmund 2003). To measure if the variables are normally distributed, we will use frequency function in descriptive statistics. We will use two indicators: skewness and kurtosis. Skewness measures asymmetry of the distribution. Figure below provides an illustration of negative and positive skew. Normally distributed values are symmetric with a skewness of 0. As an indicator of normal distribution we will use data with a skewness between –0,8 and 0,8 (Wikipedia, 2008).

Figure 9.1. Skewness

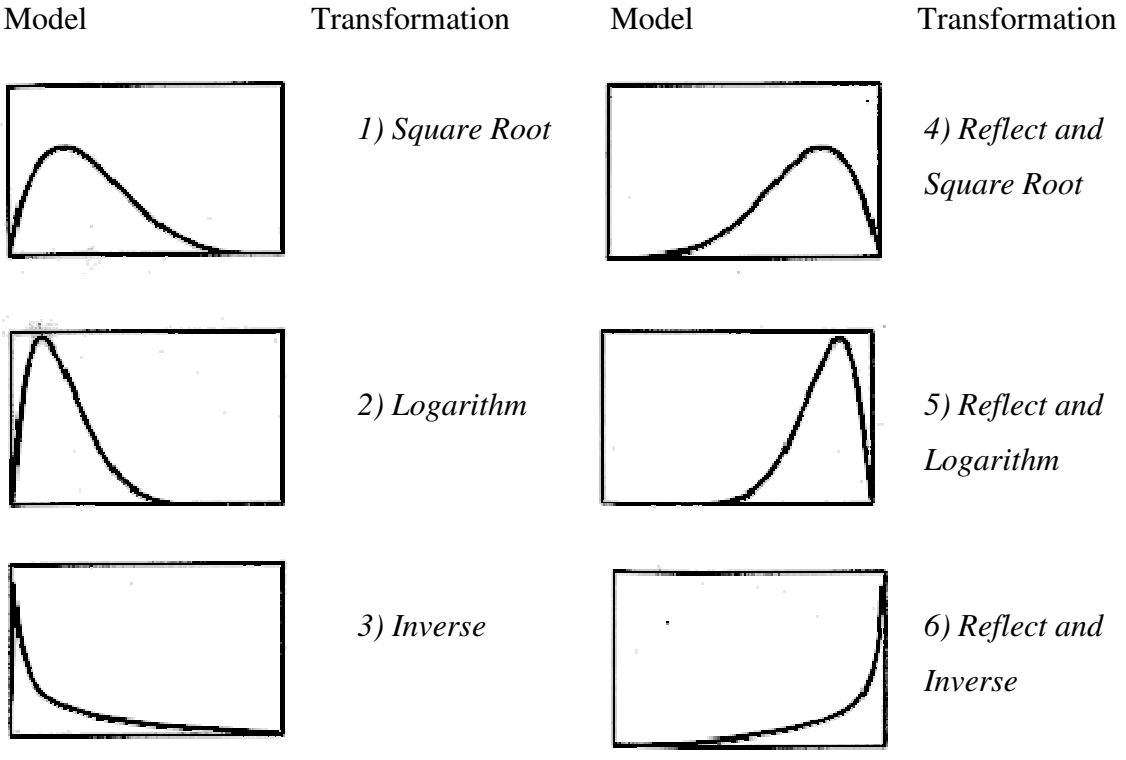


Source: Wikipedia, 2008

Kurtosis indicates how observations cluster around a central point. Normally distributed data has a Kurtosis statistic value of 0. (SPSS Tutorial, Frequencies Statistics). High values indicate that more of the variance is caused by extreme deviations. As a rule, we will consider the data to be normally distributed with kurtosis in the range of –3 to 3 (Wikipedia, 2008).
For each of the variables in the regression model, a histogram of frequency distribution was constructed. It is a good way to illustrate whether the data is normally distributed. We checked for the values of skewness and kurtosis statistic.

Several variables were not normally distributed and needed to be transformed. Variables the rating grade, operational self-sufficiency and assets rotation showed normal distribution. Variables total assets and average loans outstanding had a very high range. Other variables, like portfolio at risk and operating expense ratio had to high skewness and kurtosis values.
Common transformation techniques are square root, logarithm, inverse or power (includes all the others and cube root) (Wikipedia). Figure 10.2 provides a graphical illustration of some of the techniques.

Figure 9.2. Data Transformation



Source: PFC, 2005

Histograms on frequency distribution done in SPSS showed that some variables were positively skewed similar to the first two models. This was also confirmed by too high skewness and kurtosis values. These variables were: total assets, portfolio at risk, operating expense ratio and loan outstanding average. Square root and logarithm transformations were done to transformed the data into a suitable format. For example, variable total assets was transformed by taking a natural logarithm of the variable and creating a new variable ln_assets. The same procedure was done with average loan outstanding. After the transformation the histograms showed normal distribution and the skewness and kurtosis values were within the defined range. The new histograms of frequency distribution are provided in the next part - description of variables. Tables with skewness and kurtosis statistic values after the data transformation are also there. They show that data transformation helped to achieve normal distribution of the variables.

9.5. Description of Variables

Our model consists of one dependent and several independent variables. The dependent (the outcome) is a rating grade assigned to the MFI. The independent variables are the predictors of the model. We also added some control variables as dummies to capture for possible effects of MFI type, region where they operate or the agency that performed rating. All variables are summarized in table 10.3. Definitions are based on information from MixMarket (Mixmarket, 2008).

Descriptive statistics is used to summarize and describe data. One of the effective ways to summarize information is by using frequency distribution (Zikmund, 2003). The histograms will provide graphical illustration of that. We will also look at the mean (the arithmetic average), the median (the midpoint), the minimum and maximum values. Since several variables were transformed to achieve normal distribution, skewness and kurtosis values will be provided. As mentioned earlier, skewness ranging from –0,8 to 0,8 and kurtosis ranging from –3,0 to 3,0 will mean that the variable is normally distributed.

Table 9.1. Description of Variables

Table ??. Description of Variables

Variable	*Definition*
Size	
Total Assets (tot_assets)	Total of all net asset accounts
Risk/Portfolio Quality	
Portfolio at Risk (PAR30)	Portfolio at Risk > 30 days/ Gross Loan Portfolio
Efficiency and Productivity	
Operating Expense Ratio (operexp_portf)	Operating Expense/ Average Total Assets
Operational Self-sufficiency (oper_self_suff)	Financial Revenue (Total)/ (Financial Expense + Loan Loss Provision Expense + Operating Expense)
Profitability	
Assets Rotation (assets_rot)	Financial Revenue / Total Assets
Social performance	
Average Loan balance pr borrower (loan_outst_ave)	Gross Loan Portfolio / Number of Active Borrowers
Firm controls	
Profit motive (non-profit, profit)	NGO, COOP - non-profit, others - for profit
Rating Firm (agency)	MicroRate, Planet Rating, Microfinanza, Crisil, M-Cril
Country controls	
Regions (region)	East Asia and the Pacific, Europe and Central Asia, Latin America, Middle East and North Africa, South Asia and Sub-Saharan Africa

9.5.1 Dependent Variable

Rating

Rating refers to the rating grade assigned to the MFI after a global risk assessment is carried out. In our study, reports by 5 major MFI rating agencies have been used. Comparing rating grades between the MFI can be a challenge, since the agencies use different scales. To avoid the problem, original rating grades assigned by the different agencies were transformed into a new scale. The value of a rating grade lies in between 0 and 1, where 1 indicates the highest rating grade.

In our sample the minimum rating grade is 0 which is the lowest rating grade possible. The maximum grade of 0,8 was given to 8 MFI in our sample, which constitutes 3,5% in our sample . The average rating grade for the MFI has a value of 0,452. Figure 9.3 gives us a frequency distribution of the variable. It shows normal distribution and skewness of -0,236 and Kurtosis of -0,454 also confirm this.

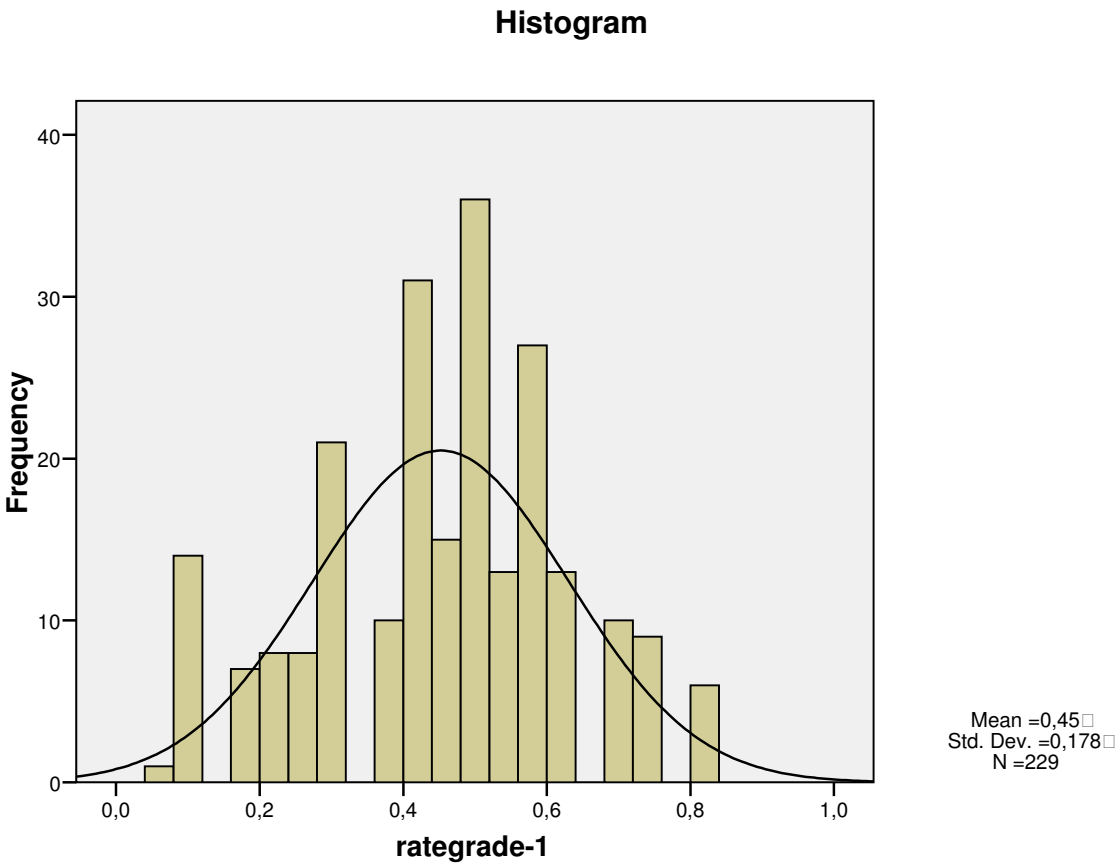
Table 9.2

Statistics

rategrade-1

N	Valid	229
	Missing	0
Mean		,452
Skewness		-,236
Std. Error of Skewness		,161
Kurtosis		-,454
Std. Error of Kurtosis		,320
Minimum		,0
Maximum		,8

Figure 9.3



9.5.2 Independent Variables

Total assets

Total assets is the most widely accepted size measure. It represents the total of all net asset accounts.

Table ?? shows that the values range from 172 203 USD to 143 811 137 USD. The raw data is unevenly distributed with a much higher number of MFIs below average. This results in skewness of 5,114 and Kurtosis of 32,328.

To avoid this problem, a new variable, natural logarithm of assets, was created. Figure ?? shows distribution of *ln_assets*. The values range from a minimum of 12,06 to a maximum of 18,78 with a mean of 15,24. Skewness is reduced to 0,175 and Kurtosis to 0,048. This size measure is normally distributed and can be used in regression analysis.

Figure 9.4

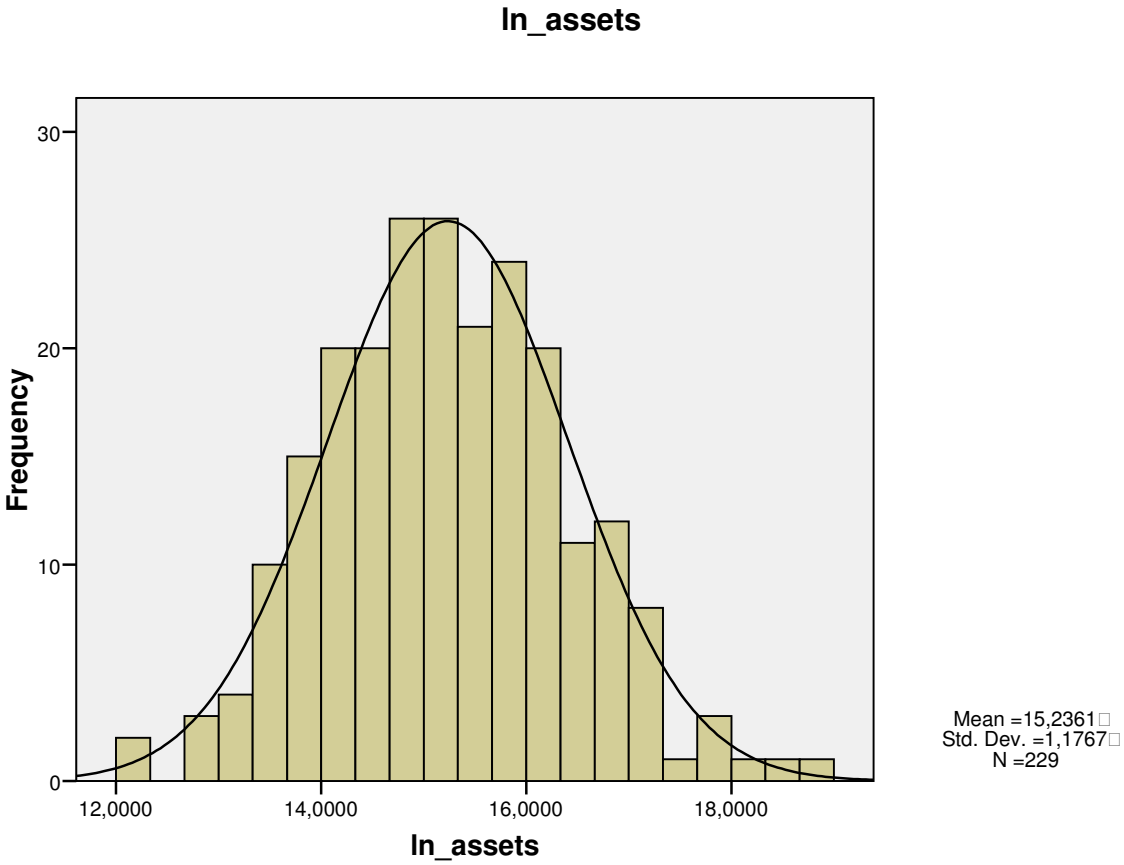


Table 9.3

Statistics

ln_assets

N	Valid	229
	Missing	0
Skewness		,175
Std. Error of Skewness		,161
Kurtosis		,048
Std. Error of Kurtosis		,320

PAR30

Risk measures are represented by portfolio quality of MFIs. PAR30 is a typical measure of portfolio quality. It is calculated by dividing the outstanding balance of all loans over 30 days and refinanced loans to total outstanding gross loan portfolio.

In our sample raw data was not normally distributed, and square root transformation was used to avoid the problem. The minimum value is 0 showing that the portfolio has no outstanding balance over 30 days or refinanced loans. The maximum value goes to 0,9950 with a mean of 0,4103. Table ?? shows that skewness is –0,124 and Kurtosis is 1,322. This indicates that our variable is normally distributed.

Figure 9.5

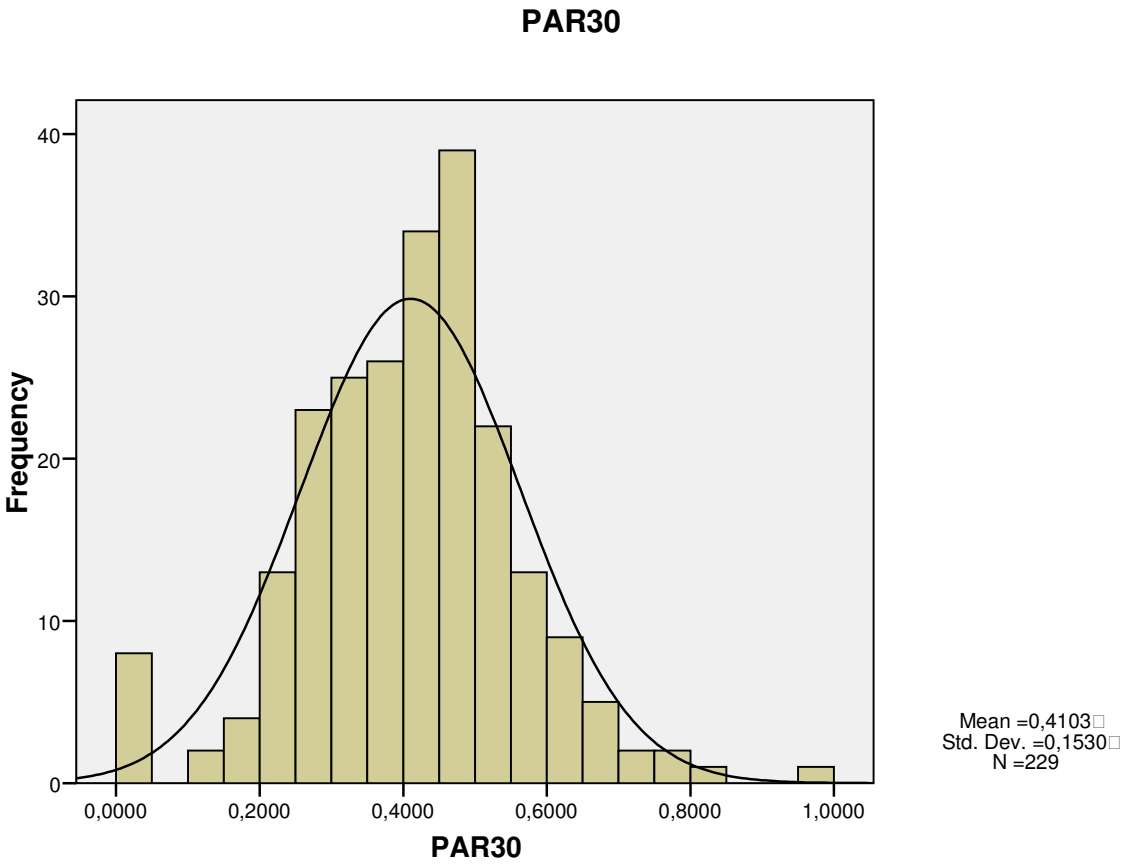


Table 9.4

Statistics

par30_sqrt2

N	Valid	229
	Missing	0
Skewness		-,124
Std. Error of Skewness		,161
Kurtosis		1,322
Std. Error of Kurtosis		,320

Operating Expense Ratio

This ratio is calculated by dividing operating expenses of the MFI by the average gross portfolio. It provides the measure of overall efficiency of a lending institution and is often referred to as the efficiency ratio (Performance Indicators, p.16).

For the purpose of the study, raw data had to be transformed by using square root. The variables have a minimum of 0,1679 and maximum of 0,9189 and a mean of 0,5023. Figure 9.6 shows frequency distribution of operating expense ratio in our sample. We can see that even after transformation the data is slightly skewed. Skewness of 0,502 confirms this. Further the table 9.5 provides a Kurtosis of –0,162.

Figure 9.6

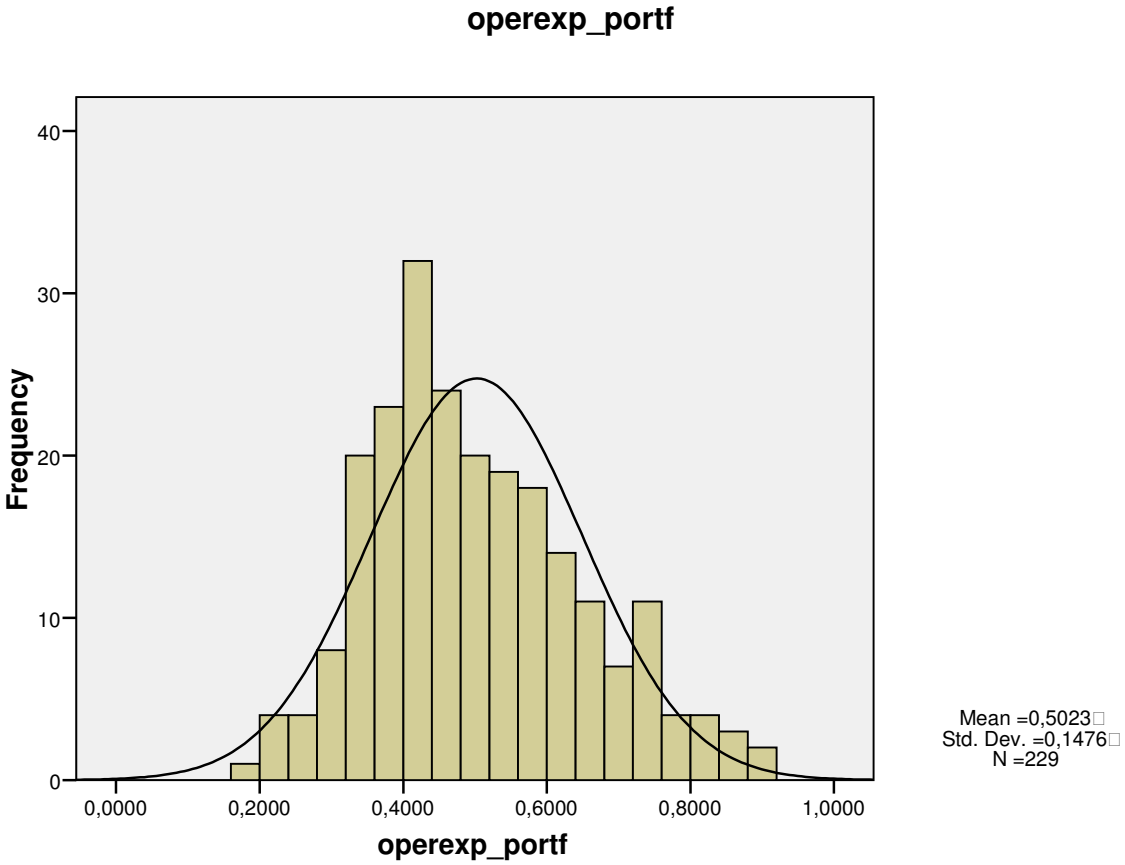


Table 9.5

Statistics

operexp_portf_sqrt

N	Valid	229
	Missing	0
Skewness		,502
Std. Error of Skewness		,161
Kurtosis		-,162
Std. Error of Kurtosis		,320

Assets Rotation

Profitability indicates the overall performance of the institution. In order to survive in the long run, financial institutions need to be profitable. The situation for MFIs is a bit special, since many of them are organized as non-profit organizations and concentrate more on social, than financial goals.

Assets rotation is a measure of institution's profitability. It is calculated by dividing financial revenue to total assets.

In our sample the values range from 0,03 to 0,63 with a mean of 0,2655. Figure ?? shows that the variable is normally distribution, so no data transformation is needed. Skewness has a value of 0,637 and Kurtosis a value of 0,030, which confirms normality.

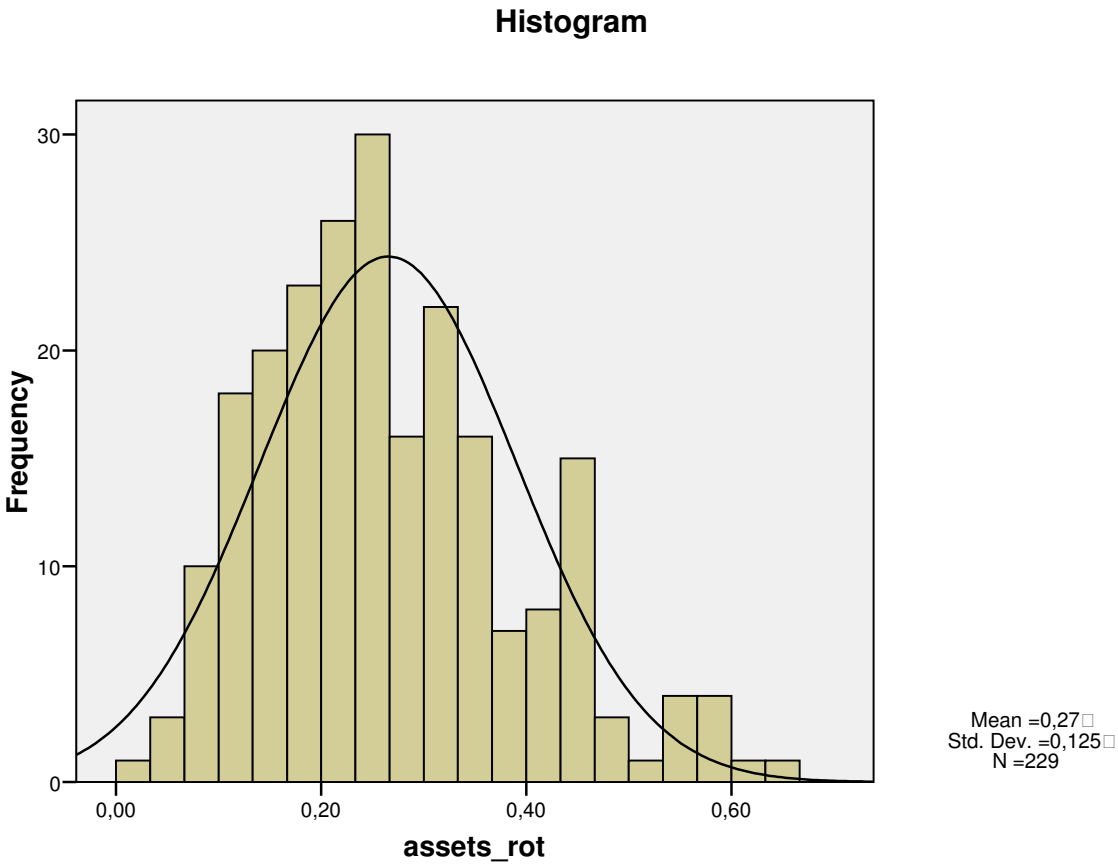
Table 9.6

Statistics

assets_rot

N	Valid	229
	Missing	0
Mean		,2655
Skewness		,637
Std. Error of Skewness		,161
Kurtosis		,030
Std. Error of Kurtosis		,320
Minimum		,03
Maximum		,63

Figure 9.7



Operating Self-Sufficiency ratio

The ratio is calculated by dividing financial revenue to the sum of operating, financial and loans loss provision expenses. This ratio captures productivity of the institution. A value greater than 1 means that MFI manages to cover their costs from their revenue.

As we see from table ?? operational self-sufficiency ratio goes from 0,1150 to 2,3370. The mean is 1,1806. 20% of the MFI have a ratio below 1 and the remaining 80% have a ratio above 1. This means that most of the institutions in our sample are able to cover their costs from revenue from the loan portfolio.

Skewness is 0,200 and Kurtosis is 1,867 showing that the variable is normally distributed. No transformation is necessary and raw data is used in the regression.

Figure 9.7

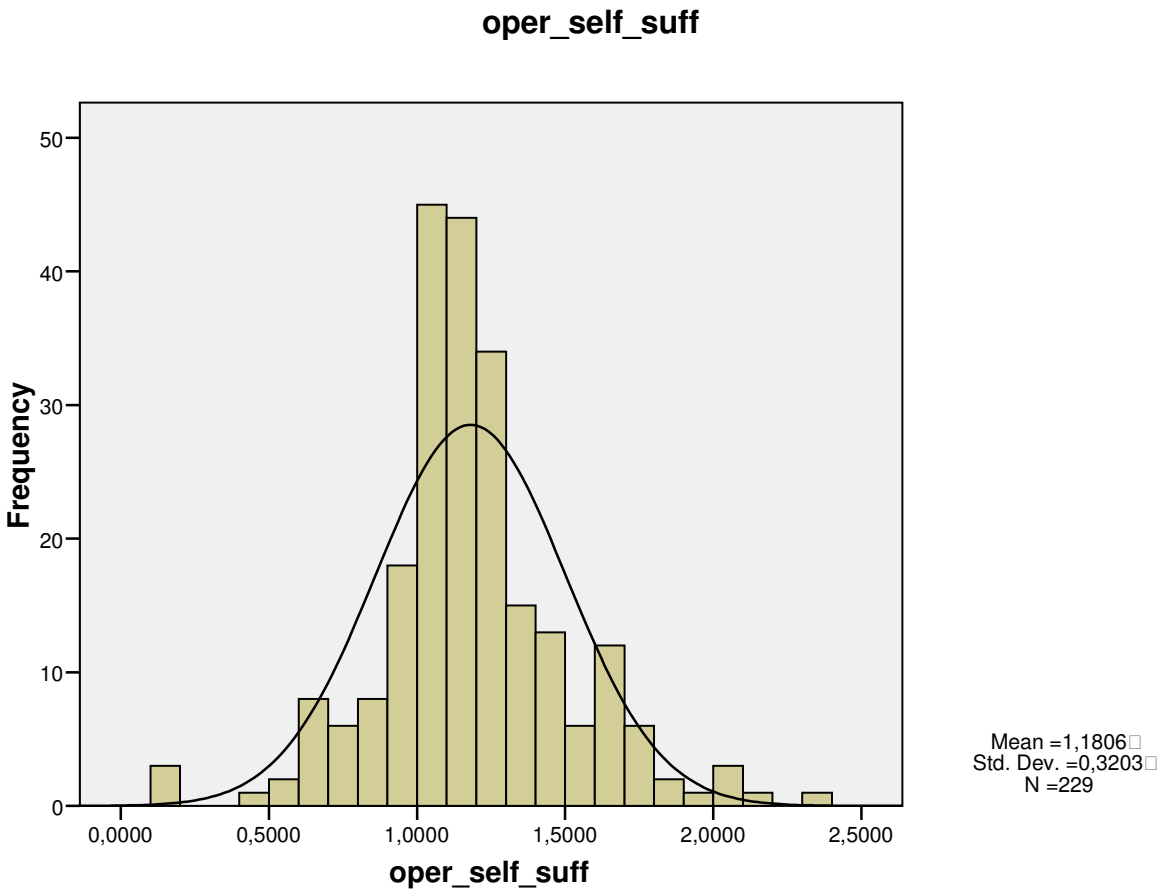


Table 9.6

Statistics

oper_self_sust

N	Valid	229
	Missing	0
Skewness		,200
Std. Error of Skewness		,161
Kurtosis		1,867
Std. Error of Kurtosis		,320

Average loans outstanding

This variable is calculated by dividing gross loan portfolio to the number of active borrowers. The value provides average size of a loan.

While banks focus on capturing wealthy clients with big loan sizes, MFIs aim to serve poor clients. These clients don't have much money, so loan sizes are small. Average loans outstanding is a measure of outreach. Smaller loan sizes indicate that institutions reach poorer clients.

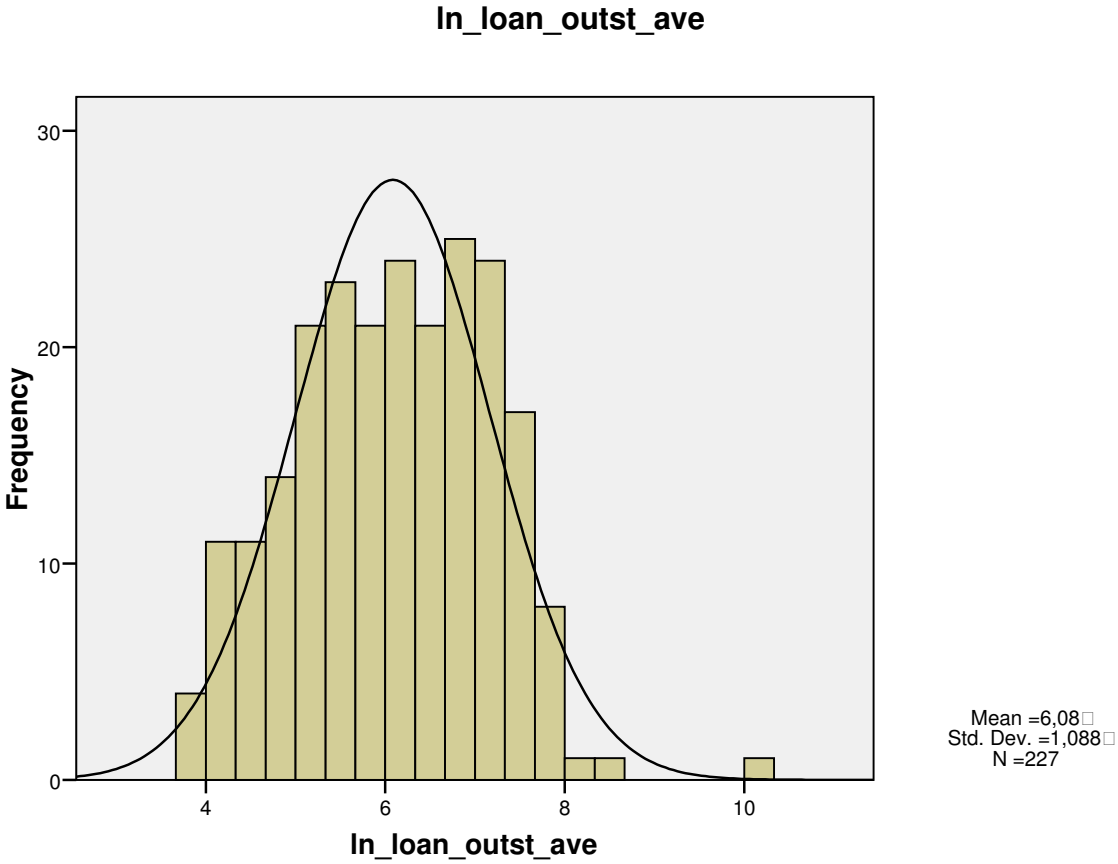
Table 9.7

Statistics

		loan_outst_avg	ln_loan_outst_ave
N	Valid	227	227
	Missing	2	2
Mean		814,58	6,08
Skewness		11,529	,058
Std. Error of Skewness		,162	,162
Kurtosis		156,192	-,256
Std. Error of Kurtosis		,322	,322
Minimum		49	4
Maximum		24589	10

Sample in this study has information on 227 MFIs. The minimum value is 49 USD for BANDHAN from India and FOCCAS from Uganda. The maximum value of 24 589 USD is for Rural Finance Corporation working in Moldova. This high value can be misleading, since it is much higher compared to the rest of the sample (next maximum value is only 4958 USD). The mean is 814,58 due to the high maximum value, so median of 433 gives a more correct picture. With a skewness of 11,529 the data needed to be transformed. Creating a new variable did this - ln_loan_outst_ave. Transformed data had a skewness of 0,058 and Kurtosis of –0,256. This indicates that the variable is normally distributed and this also can be seen from figure 9.8.

Figure 9.8



Region

The data in our study represents MFIs from 61 countries all over the world. Region is a country control variable. It is divided into 6 dummy variables depending on which region of the world the MFI represented: East Asia and the Pacific, Europe and Central Asia, Latin America, Middle East and North Africa, South Asia and Sub-Saharan Africa. MFI that operates in East Asia and the Pacific got a value of 1, while the rest of the variables a value of 0. The same procedure was done for remaining five variables.

Table 9.8 shows that almost half of the ratings represent Latin America. Microfinance is well developed in Latin America, and that's where the MFI rating industry first started. Only 5% of the ratings represent Middle East and North Africa.

Table 9.8

Statistics

region

N	Valid	229
	Missing	0

region

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	20	8,7	8,7	8,7
	2	44	19,2	19,2	27,9
	3	108	47,2	47,2	75,1
	4	11	4,8	4,8	79,9
	5	14	6,1	6,1	86,0
	6	32	14,0	14,0	100,0
	Total	229	100,0	100,0	

Agency

This is a firm control variable representing the agency that performed global risk assessment. It consists of five dummy variables: MicroRate, PlanetRating, Microfinanza, Crisil and Mcril. If MicroRate performed the rating, dummy MicroRate had a value of 1 and the other variables a value of 0. This procedure was done to the rest of the dummy variables.

Table 9.9 shows that 38,9% of the evaluations was performed by Planet Rating; 26,2% by Microfinanza; 21,4% by MicroRate; 12,2% by M-Cril and only 1,3% by Crisil. This can be explained by the fact that Crisil operates only in South Asia, while the other four agencies perform evaluations all over the world.

Table 9.9

Statistics

agency

N	Valid	229
	Missing	0

agency

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	49	21,4	21,4	21,4
	2	89	38,9	38,9	60,3
	3	60	26,2	26,2	86,5
	4	3	1,3	1,3	87,8
	5	28	12,2	12,2	100,0
	Total	229	100,0	100,0	

Type

This is a firm control variable. It consists of two dummy variables. NonProfit indicates that MFI is a nonprofit organization. It includes MFIs organized as NGOs and cooperatives/credit unions. Banks, non-bank financial institutions and other profit driven microfinance providers were included in the other dummy variable – Profit. If MFI is organized as a non-profit organization, a value of 1 was assigned to it and a value of 0 to the other variable - Profit. The same was done if the organization was for profit.

Table ?? shows that 70 % of the MFIs are non profit organizations leaving the remaining 30 as for profit organizations.

Table 9.10

Statistics

type

N	Valid	229
	Missing	0

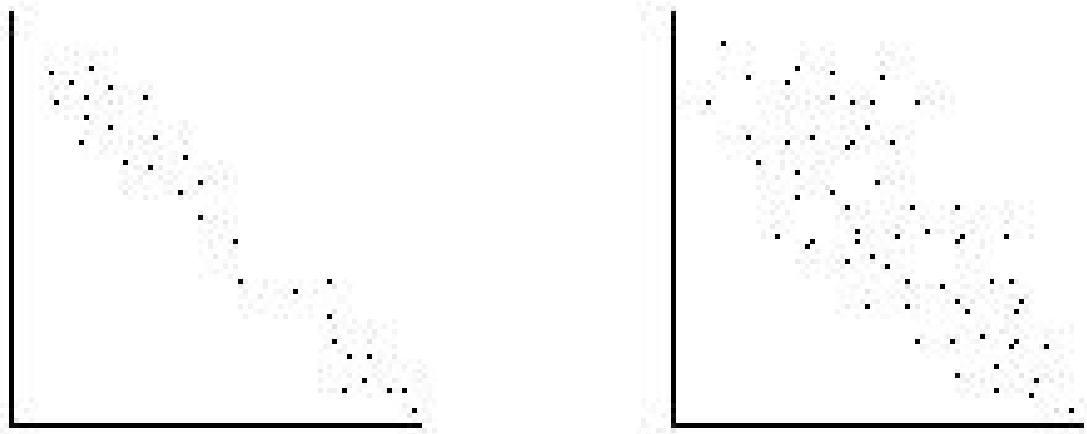
type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	10	4,4	4,4	4,4
	2	54	23,6	23,6	27,9
	3	134	58,5	58,5	86,5
	4	27	11,8	11,8	98,3
	6	4	1,7	1,7	100,0
	Total	229	100,0	100,0	

9.6. Correlation

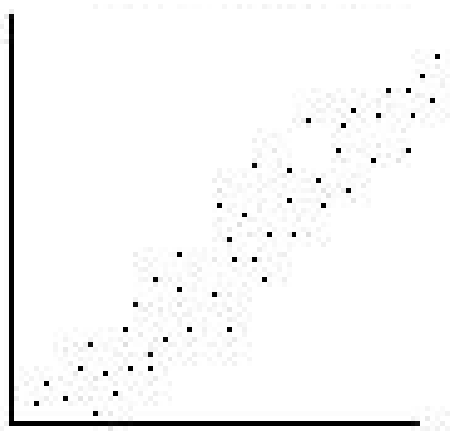
Correlation describes a relationship between two random variables. This relationship has two measures: strength and direction. Correlation coefficient ranges from –1 to 1. There is no exact answer to what size of the coefficient defines a strong relationship. For example, in a physics study with precise tools a coefficient of 0,9 can be too low (Wikipedia, 2008). In social sciences a coefficient below 0,3 is defined as low, from 0,3 to 0,5 as moderate and above 0,5 as strong. The direction of the relationship is indicated by the sign of the correlation coefficient: "plus" stands for a positive relationship between the variables and "minus" - for negative. A correlation coefficient of 0 means that the variables are not related.
A positive correlation means that as the values of the first variable increase, the values of the other variable tend also to increase. Likewise as the first variable decrease, so does the other variable. A negative correlation means that increase in the values of the first variable tend to decrease in the values of the second variable and the other way around. Figure 9.9 illustrates the discussed types of correlations. (http://blogs.ittoolbox.com/eai/implementation/archives/building-scatter-diagrams-15862)

Figure 9.9

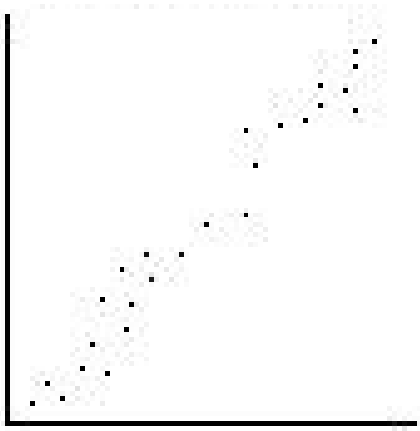


Strong negative correlation *Weak negative correlation*

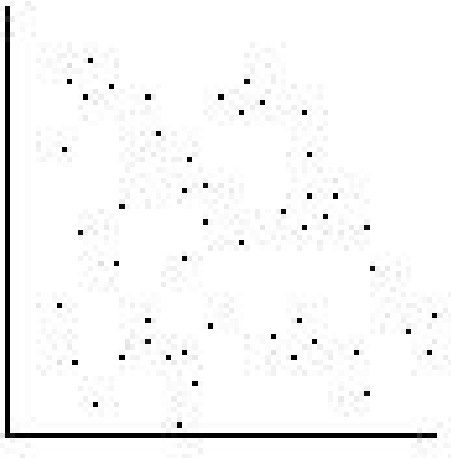
Weak positive correlation



Strong positive correlation



No correlation



There is a number of ways to calculate correlation between two variables: Pearson's correlation, Spearman's rho and Kendall's tau-b. Non-symmetric or ordinal data require use of Spearman coefficient or Kendall''s tau-b. Pearson coefficient is used for continuos symmetric data (SPSS). It is obtained by dividing the covariance of the two variables by the product of their standard deviations (Wikipedia, 2008).

Regression analysis helps us to find the relationship between the dependent and independent variables. Multicollinearity is a problem that occurs when independent variables used in

research are highly correlated. They may measure the same thing thus measuring contribution of each variable can give misleading results. (SPSS, p.180).

One of the ways to check for multicollinearity is to use a correlation matrix. Pearson correlation coefficient above 0,5 indicates strong relationships between the variables. Such cases will be given a special attention. A very high coefficient can be a sign of multicollinearity and such variables should not be used in the analysis. The value of Pearson's r that signals potential multicollinearity is defined differently, but generally the limit goes between 0,7 and 0,9 (Online Econometrics Book, Regression Extensions, Detection of Multicollinearity, http://www.xycoon.com/detection.htm). In our study we will not use any variables with a correlation coefficient above 0,7.

9.6. Comments to the Correlation Matrix

Portfolio at Risk over 30 days

There exists weak correlation between the variable and the average loan outstanding, assets rotation, operational self-sufficiency and reports rated by MicroRate and M-Cril. There is also a weak correlation with the reports from different regions. All these correlations are weak and require no special attention.

Ln average Loan Outstanding

The following variables show weak or moderate correlations: par30, ln_loan_outst_ave, ln_assets, assets rotation, all the regions and Microfinanza, Crisil and MCril. All these values are below 0,7 and can be used in the regression model.

Operating Expense Ratio

All correlations are below 0,7. Assets rotation is the only variable that has a strong correlation coefficient of 0,685. This means high operating expense ratio is found more often within MFIs with high assets rotation.

Ln Assets

The variable has some weak correlations. The only moderate correlation of –0,393 is with variable operating expense ratio. This is consistent with a fact that big MFIs have usually higher efficiency.

Assets Rotation

The rotation ratio shows a few weak correlations to risk, outreach, size and productivity indicators. There are exists also a strong correlation with efficiency indicator – operating expense ratio that was discussed earlier. Weak correlations exist with dummy variables MCril and LatinAmerica.

Operational Self-Sufficiency

All coefficients are within the limits. Only weak correlations exist with some of the variables.

Agencies

MicroRate, PlanetRating, Microfinanza, Crisil and MCril are dummy variables. MCril had two strong correlations. Pearson correlation of 0,546 with variable East Asia Pacific and of 0,572 with variable South Asia. This is because only few ratings by this agency were used in this study and the ones that were used relate to MFIs operating in these regions.

Regions

EastAsiaPacific, EuropeCenAsia, LatinAmerica, MENA, South Asia and SubSahAfrica are also dummy variables. Only two strong correlations exist, both to variable MCril (see explanation above).

Type

NonProfit and Profit are dummy variables indicating whether MFI is profit driven. They indicate perfect negative correlation with each other. This will not be a problem in our case, since only 1 dummy variable is used in the regression (n-1).

Table 9.11 Correlation Matrix

Correlations

		par30_sqrt2	ln_loan_outst_ave	operexp_portf_sqrt	ln_assets	assets_rot	oper_self_sust	Microrate	PlanetRating	Microfinanza	Crisil	MCril	EastAsiaPacific	EuropeCenAsia	LatinAmerica	MENA	SouthAsia	SubSahAfrica	NonProfit	Profit
par30_sqrt2	Pearson Correlation	1	,277(**)	-,067	,005	-,147(*)	-,249(**)	,145(*)	-,005	-,005	,041	-,181(**)	-,060	-,190(**)	,292(**)	-,249(**)	-,195(**)	,133(*)	,033	-,033
	Sig. (2-tailed)		,000	,313	,943	,026	,000	,028	,937	,936	,533	,006	,368	,004	,000	,000	,003	,045	,616	,616
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
ln_loan_outst_ave	Pearson Correlation	,277(**)	1	-,488(**)	,269(**)	-,243(**)	,105	-,016	,020	,319(**)	-,152(*)	-,385(**)	-,266(**)	,361(**)	,217(**)	-,152(*)	-,362(**)	-,164(*)	-,028	,028
	Sig. (2-tailed)	,000		,000	,000	,000	,115	,808	,768	,000	,022	,000	,000	,000	,001	,022	,000	,014	,675	,675
	N	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227
operexp_portf_sqrt	Pearson Correlation	-,067	-,488(**)	1	-,393(**)	,685(**)	-,255(**)	,057	,027	-,057	-,060	-,015	,063	-,142(*)	,071	-,019	-,102	,090	,070	-,070
	Sig. (2-tailed)	,313	,000		,000	,000	,000	,389	,680	,391	,367	,820	,345	,032	,283	,772	,122	,175	,293	,293
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
ln_assets	Pearson Correlation	,005	,269(**)	-,393(**)	1	-,275(**)	,234(**)	,248(**)	-,034	-,093	,000	-,134(*)	-,031	-,021	-,033	,097	-,100	,106	-,163(*)	,163(*)
	Sig. (2-tailed)	,943	,000	,000		,000	,000	,000	,605	,160	,996	,043	,638	,747	,620	,143	,131	,108	,013	,013
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
assets_rot	Pearson Correlation	-,147(*)	-,243(**)	,685(**)	-,275(**)	1	,153(*)	,094	-,015	,076	-,053	-,178(**)	-,027	,051	,220(**)	-,066	-,223(**)	-,158(*)	,036	-,036
	Sig. (2-tailed)	,026	,000	,000	,000		,021	,157	,822	,255	,427	,007	,681	,445	,001	,323	,001	,017	,588	,588
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
oper_self_sust	Pearson Correlation	-,249(**)	,105	-,255(**)	,234(**)	,153(*)	1	,002	,060	,030	-,027	-,123	-,044	,133(*)	-,032	,100	-,111	-,054	,050	-,050
	Sig. (2-tailed)	,000	,115	,000	,000	,021		,974	,365	,654	,684	,063	,503	,045	,633	,131	,095	,414	,454	,454
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
Microrate	Pearson Correlation	,145(*)	-,016	,057	,248(**)	,094	,002	1	-,416(**)	-,311(**)	-,060	-,195(**)	-,161(*)	-,254(**)	,254(**)	-,067	-,133(*)	,189(**)	-,127	,127
	Sig. (2-tailed)	,028	,808	,389	,000	,157	,974		,000	,000	,365	,003	,014	,000	,000	,310	,044	,004	,055	,055
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
PlanetRating	Pearson Correlation	-,005	,020	,027	-,034	-,015	,060	-,416(**)	1	-,475(**)	-,092	-,298(**)	-,088	-,093	,036	,198(**)	-,203(**)	,144(*)	,146(*)	-,146(*)
	Sig. (2-tailed)	,937	,768	,680	,605	,822	,365	,000		,000	,166	,000	,185	,160	,584	,003	,002	,030	,028	,028
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
Microfinanza	Pearson Correlation	-,005	,319(**)	-,057	-,093	,076	,030	-,311(**)	-,475(**)	1	-,069	-,222(**)	-,184(**)	,440(**)	,014	-,087	-,152(*)	-,212(**)	,039	-,039
	Sig. (2-tailed)	,936	,000	,391	,160	,255	,654	,000	,000		,301	,001	,005	,000	,833	,188	,021	,001	,552	,552
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
Crisil	Pearson Correlation	,041	-,152(*)	-,060	,000	-,053	-,027	-,060	-,092	-,069	1	-,043	,100	-,056	-,109	-,026	,291(**)	-,046	-,009	,009
	Sig. (2-tailed)	,533	,022	,367	,996	,427	,684	,365	,166	,301		,517	,130	,397	,100	,697	,000	,484	,890	,890
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
MCril	Pearson Correlation	-,181(**)	-,385(**)	-,015	-,134(*)	-,178(**)	-,123	-,195(**)	-,298(**)	-,222(**)	-,043	1	,546(**)	-,114	-,353(**)	-,084	,572(**)	-,150(*)	-,108	,108

	Sig. (2-tailed)	,006	,000	,820	,043	,007	,063	,003	,000	,001	,517		,000	,084	,000	,206	,000	,023	,105	,105
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
EastAsiaPacific	Pearson Correlation	-,060	-,266(**)	,063	-,031	-,027	-,044	-,161(*)	-,088	-,184(**)	,100	,546(**)	1	-,151(*)	-,292(**)	-,069	-,079	-,125	-,205(**)	,205(**)
	Sig. (2-tailed)	,368	,000	,345	,638	,681	,503	,014	,185	,005	,130	,000		,022	,000	,295	,234	,060	,002	,002
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
EuropeCenAsia	Pearson Correlation	-,190(**)	,361(**)	-,142(*)	-,021	,051	,133(*)	-,254(**)	-,093	,440(**)	-,056	-,114	-,151(*)	1	-,461(**)	-,110	-,124	-,197(**)	-,071	,071
	Sig. (2-tailed)	,004	,000	,032	,747	,445	,045	,000	,160	,000	,397	,084	,022		,000	,098	,060	,003	,283	,283
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
LatinAmerica	Pearson Correlation	,292(**)	,217(**)	,071	-,033	,220(**)	-,032	,254(**)	,036	,014	-,109	-,353(**)	-,292(**)	-,461(**)	1	-,212(**)	-,241(**)	-,381(**)	,174(**)	-,174(**)
	Sig. (2-tailed)	,000	,001	,283	,620	,001	,633	,000	,584	,833	,100	,000	,000	,000		,001	,000	,000	,008	,008
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
MENA	Pearson Correlation	-,249(**)	-,152(*)	-,019	,097	-,066	,100	-,067	,198(**)	-,087	-,026	-,084	-,069	-,110	-,212(**)	1	-,057	-,091	,101	-,101
	Sig. (2-tailed)	,000	,022	,772	,143	,323	,131	,310	,003	,188	,697	,206	,295	,098	,001		,388	,172	,126	,126
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
SouthAsia	Pearson Correlation	-,195(**)	-,362(**)	-,102	-,100	-,223(**)	-,111	-,133(*)	-,203(**)	-,152(*)	,291(**)	,572(**)	-,079	-,124	-,241(**)	-,057	1	-,103	,046	-,046
	Sig. (2-tailed)	,003	,000	,122	,131	,001	,095	,044	,002	,021	,000	,000	,234	,060	,000	,388		,121	,487	,487
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
SubSahAfrica	Pearson Correlation	,133(*)	-,164(*)	,090	,106	-,158(*)	-,054	,189(**)	,144(*)	-,212(**)	-,046	-,150(*)	-,125	-,197(**)	-,381(**)	-,091	-,103	1	-,096	,096
	Sig. (2-tailed)	,045	,014	,175	,108	,017	,414	,004	,030	,001	,484	,023	,060	,003	,000	,172	,121		,146	,146
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
NonProfit	Pearson Correlation	,033	-,028	,070	-,163(*)	,036	,050	-,127	,146(*)	,039	-,009	-,108	-,205(**)	-,071	,174(**)	,101	,046	-,096	1	-1,000(**)
	Sig. (2-tailed)	,616	,675	,293	,013	,588	,454	,055	,028	,552	,890	,105	,002	,283	,008	,126	,487	,146		,000
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229
Profit	Pearson Correlation	-,033	,028	-,070	,163(*)	-,036	-,050	,127	-,146(*)	-,039	,009	,108	,205(**)	,071	-,174(**)	-,101	-,046	,096	-1,000(**)	1
	Sig. (2-tailed)	,616	,675	,293	,013	,588	,454	,055	,028	,552	,890	,105	,002	,283	,008	,126	,487	,146	,000	
	N	229	227	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229	229

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

10. Regression Analysis

10.1 Basic regression model

Once we studied theory on ratings, designed hypotheses, selected and checked the data, it is time to do the study. Our model consists of one dependent variable – rating grade and several independent variables, such as MFI size, profitability, efficiency, productivity, risk and outreach. Also a few dummy variables are created to check for whether there is a difference between what agency rated the MFI, where the MFI is located and whether it is profit driven.

Regression analysis allows us to look at the effect between one independent and one or few independent variables. The basic regression model is a bivariate linear regression:

$Y = \alpha + \beta X + e$

(source: Business Research Methods, p.556)

Where:

Y = the dependent variable

X = the independent (predictor) variable

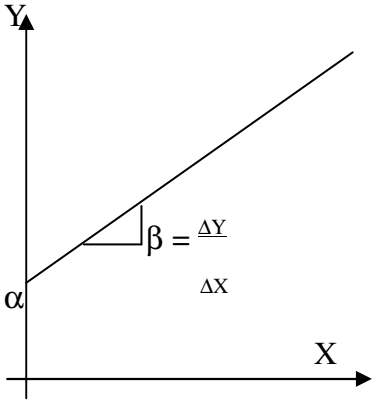
α = the Y intercept

β = the slope coefficient

e = the residual (difference between actual and estimated value of the dependent variable)

This model represents a straight-line relationship. To better understand the model, let's look at figure 10.1.

Figure 10.1. Linear regression model with one independent variable.



The intercept α shows where regression line intersects the Y-axis. If the independent variable X is equal to zero and β is the slope coefficient, then the dependent variable Y is equal to α. In our case the dependent variable Y is MFI's rating. MFI size is the independent variable. If β equals 0,5, then increase of MFI size by 1 would cause the rating to increase by 0,5. If institution's size were equal to zero, then the rating would also be equal to zero.

10.2 Multiple Regression Analysis

Our model suggests that rating depends not on one, but on several factors. Multiple regression analysis "allows for the simultaneous investigation of the effect of two or more independent variables on a single interval-scaled dependent variable" (Zikmund, 2003)

Multiple regression equation is presented below:

$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_{3+\ldots+} \beta_n X_n + e$ *(Zikmund, 2003)*

Like in the previous model Y is the dependent variable and α is the intercept. The difference is that there are several slope coefficients $\beta_1, \beta_2, \beta_3 \ldots \beta_n$ which measure the effect of each of the independent variables $X_1, X_2, X_3 \ldots X_n$ on the dependent variable Y. The residual e represents deviations in the dependent Y that isn't explained by the regression.

P-values help us to check whether a statistically significant relationship exists. P-value is the probability for the relationship to exist in our sample if there were no relationship in the population. (source: Muijs, p. 162). Usually a p-value of 0,05 indicates that a relationship is significant. In other words a p-value of 0,05 means that there is a 95% probability that the independent variable effects the model.

Dummy Variables

Dummy variables represent subgroups of the sample. (http://www.socialresearchmethods.net/kb/dummyvar.php). They enable us to check for the effect between different treatment groups. Dummy variables have a value of 0 or 1. A value

of 1 is means that the variable is in the treated group and a value of 0 - that the variable is in the control group.

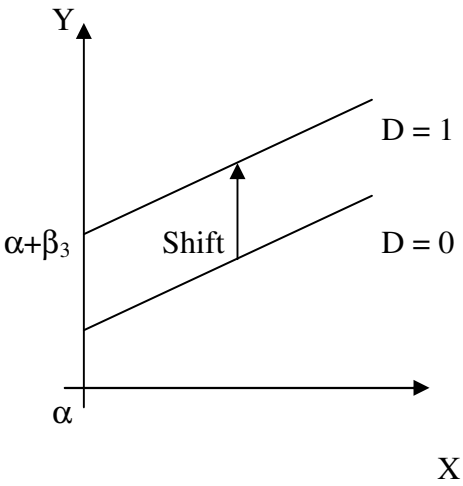
After adding a dummy variable to a multiple regression model with two independent variables will change the equation to:

$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 D + e$ *(Zikmund, 2003)*

Where D is a dummy variable. Dummy variables help us to understand whether being exposed to a special treatment group has the effect on the dependent. If n is a number of categories, then n-1 dummy variables should be included in the regression. If all the variables are added, they will explain each other and we will have a problem of multicollinearity.

Figure ?? shows the effect of a dummy variable on the regression line.

Figure 10.2 The effect of adding a dummy variable to a linear regression model



In our study we have two different groups. Those MFI that are non-profit organizations and those that are for profit. Then n-1 dummy variables would mean adding one dummy to our regression model. Assume that a dummy value of 1 refers to non-profit organizations and of 0 to for profit organizations. When the value of our dummy variable is 1 (D = 1), the regression line shifts upward and crosses the Y-axis at a point $\alpha+\beta_3$. The new regression line represents MFI that are non-profit organizations. When the dummy variable has a value of 0 (D = 0) then the regression line remains unchanged and represents for profit organizations.

10.3 Coefficient of Multiple Determination R^2

While p-values show us how the independent variables relate to the dependent whether there exists a significant relationship between each independent variable and the dependent, coefficient of multiple determination R^2 helps us to see how the all of the independent variables together predict the outcome (source: Muijs, p.162). R^2 shows what percentage of the variance in the dependent variable Y is explained by all the independent variables together. The value of this coefficient ranges from 0 to 1. If R^2 has a value of 0,65, it means that our independent variables explain 65% of the variance in the dependent variable Y. Usually, more of the variation in Y can be explained by adding extra independent variables to the regression model (Zikmund, 2003).

10.4. R^2 adjusted

When performing a study, we usually draw samples from the population. R^2 adjusted is a correction coefficient to R^2. It shows how well the model fits the whole population and not only our sample and is adjusted downwards. (Source: Muijs, p. 165). The coefficient will increase only if adding a new variable to the model will improve it more than expected by chance (wikipedia).

We should be careful using R^2 adjusted. It will only be helpful in explaining our model if the study was performed using a sample. If the research was done using the whole population, then using R^2 adjusted will not provide more explanation than R^2. (wikipedia)

This study is done using a sample from the population. Therefore R^2 adjusted will be used to measure how well the independent variables describe the amount of variance in the dependent variable – rating. The value of this coefficient also ranges from 0 to 1. Muijs (source? Muijs, p. 166) provides following guidelines to see if the model fits:

Below 0,1: poor fit
0,11-0,3: modest fit
0,31-0,5: moderate fit
above 0,5: strong fit

10.5 Regression Analysis of the Rating Function

Regression Analysis with one independent variable.

We start our analysis with the basic linear regression model described earlier. It shows the relationship between the dependent and one independent variables. The dependent variable in this research is the rating grade of the MFI. The first independent variable we will look at is total assets, which measures the MFI size.
The results of the regression analysis are presented in the table below:

Table 10.1. Regression analysis with one independent variable

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,481(a)	,231	,228	,1567

a Predictors: (Constant), ln_assets

Coefficients(a)

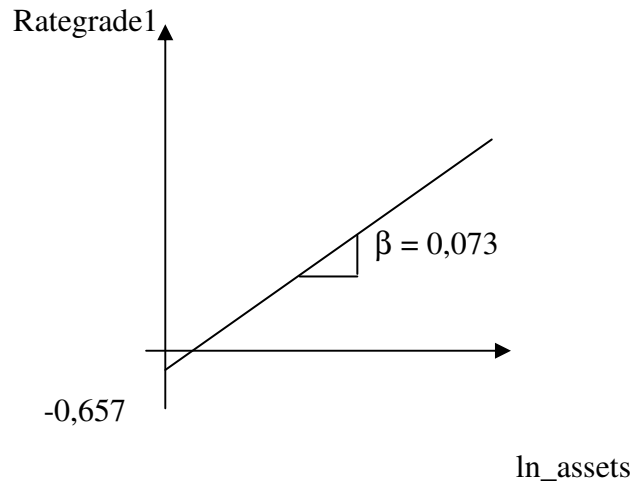
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,657	,135		-4,878	,000
	ln_assets	,073	,009	,481	8,259	,000

a Dependent Variable: rategrade1

Coefficient of multiple determination R^2 has a value of 23,1%. It means that total assets of MFIs explain 23,1% of the variance in rating grades. When we look at the adjusted R^2 , we notice that the value decreases to 22,8%. Since we used a sample of the population in our study, it means that 22,8 % of the variance in rating grades in the population is explained by total assets.

The constant has a value of –0,657. This means that a MFI that has a ln_assets value of 0 has a rating of –0,657. B coefficient tells us that the rating grade will increase by 0,073 if ln_assets increase by 1 unit. This is presented in figure ??.

Figure 10.3 Regression line with one independent variable - ln_assets



Our variables are measured in different scales, so we should look at Beta coefficient for better understanding of the effect size of the independent variable. It is a standardized coefficient, so the variables are measured on the same scale (Muijs, p.168). Beta has the highest value of 1 and lowest value of 0. In our case, the standardized Beta coefficient is 0,481.

Statistical significance of 0 means that our independent variable ln_assets is significant at the 5% level.

Regression Analysis with six independent variables

Our regression model consists of six independent variables. These are: total assets as a measure of MFI's size; PAR 30 as a measure of risk; operating expense ratio as a measure of efficiency; operating self sufficiency as a measure of productivity; assets rotation as profitability measure and average loans outstanding as a measure of outreach.

We have already looked at the relationship between MFI's size and the rating grade. Let's see how adding additional variables will influence our regression model.

Table10.2. Regression analysis with six independent variables

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,727(a)	,528	,515	,1235

a Predictors: (Constant), ln_loan_outst_ave, oper_self_suff, assets_rot, PAR30, ln_assets, operexp_portf

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,399	,147		-2,715	,007
	ln_assets	,064	,008	,423	8,232	,000
	PAR30	-,481	,058	-,416	-8,229	,000
	operexp_portf	-,248	,099	-,206	-2,503	,013
	oper_self_suff	,086	,031	,156	2,757	,006
	assets_rot	,277	,104	,195	2,654	,009
	ln_loan_outst_ave	,003	,009	,021	,378	,706

a Dependent Variable: rategrade1

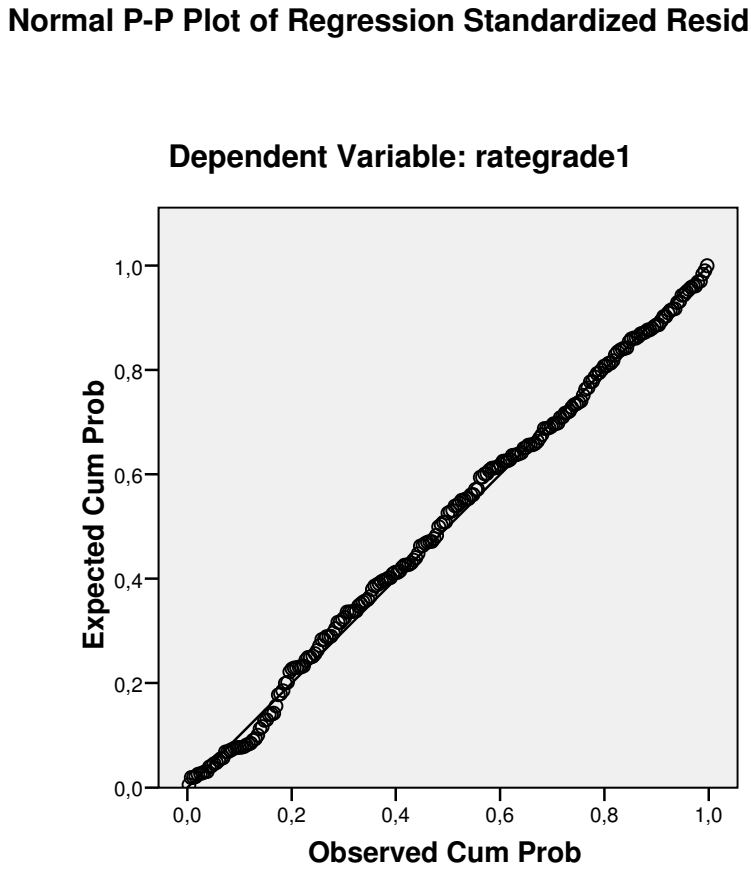
Coefficient of multiple determination R^2 has a value of 52,8% and the adjusted R^2 has a value of 51,5%. Both values have increased compared to when we used only one independent variable in our regression model. It means that adding these extra variables helped us to explain more of the variance in our dependent variable – the rating grade.

Now let's take a closer look at the independent variables. B coefficients tell us by what value the rating grade will change if the independent variable changes by 1 unit. A risk measure PAR 30 has the highest B coefficient of –0,481, so the rating grade would decrease by 0,481 if PAR30 increases by 1. Remember, that Beta coefficients are standardized so the variables are measured using the same scale. Though PAR30 has the highest B coefficient MFI size (ln_assets) has the strongest influence on the rating grade with the highest Beta coefficient of 0,423. PAR30 has the second highest influence with a Beta coefficient of –0,416.

All but one variable are significant at the 5% level. This means that we can say with 95% confidence that ln_assets, PAR30, operexp_portf, oper_self_suff and assets_rot influence the rating grade. Variable ln_loan_outst_ave, which is an outreach measure, has a significance value of 0,706. This means that the variable is not significant in explaining the regression and should not be included in our model.

The probability-probability (P-P) plot of regression standardized residual is presented in figure ?? below. X-axis represent observed cumulative probability and Y-axis represent theoretical expected cumulative probability. From the plot we can see that the observed value of the regression standardized residual fits the line well with only slight deviations. This means that the residual is normally distributed.

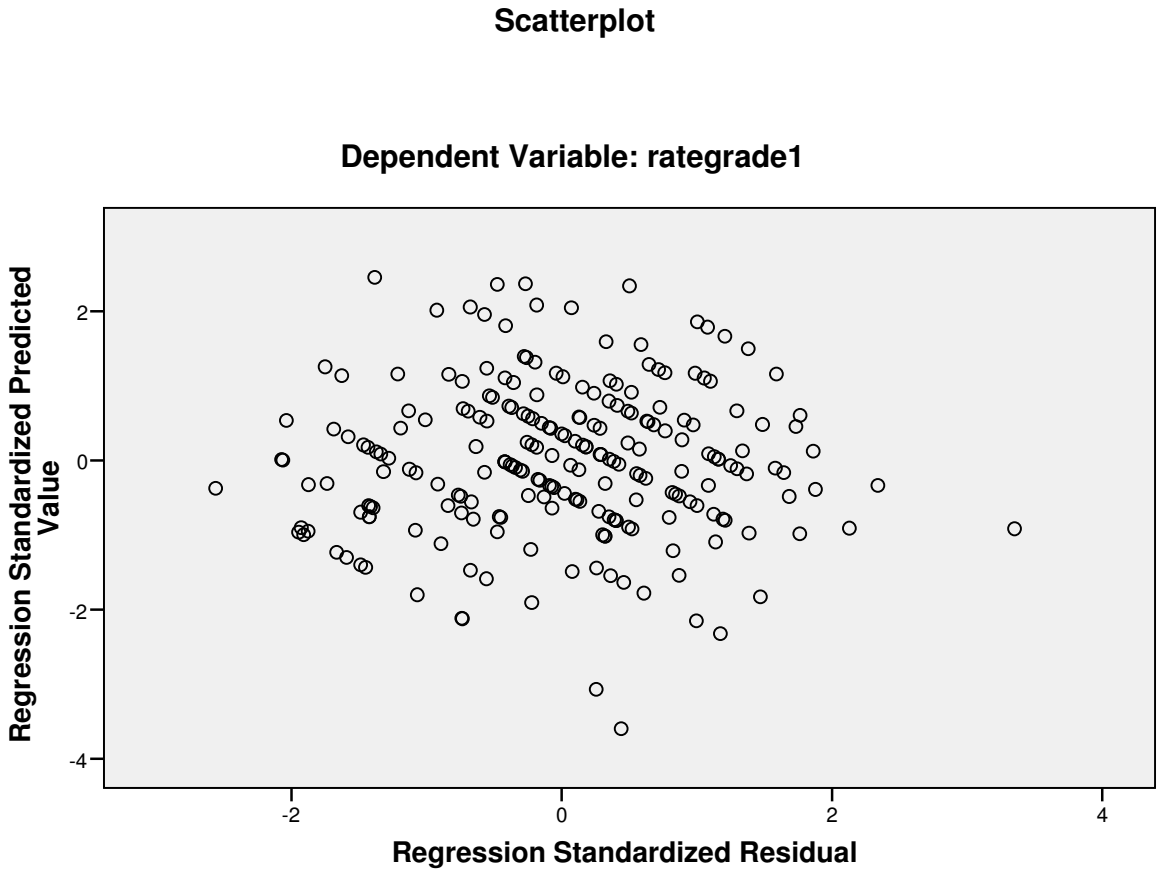
Figure 10.4



The scatterplot of the regression standardized residual (figure ??) is presented below. The standardized residuals from our study are plotted against the predicted values from our model.

The scatter plot is spread and shows no pattern of decreasing or increasing with change in the predicted value. This means that the assumption of homoscedasticity (equal variance) is true.

Figure 10.5



Regression Analysis with all variables

The data in our sample is gathered from rating reports performed by 5 major rating agencies. These rating agencies are MicroRate, Planet Rating, Microfinanza, Crisil and M-Cril. As mentioned earlier, both rating scales and methodologies differ through the agencies. All rating grades in our sample have been transformed into a standardized rating scale. Adding a dummy for the rating agencies may help to explain the model better.

Another dummy used in this study is organization type. Previously MFIs were organized as non-profit institutions. In the last years the tendency has changed and more MFIs are

organized as (or transformed into) profit driven. One of the main arguments is that for profit institutions may achieve better financial results. Rating reports study the financial performance of the MFI and the organization itself with its mission and goals. Let's see if adding a dummy for the MFI type will influence the model.

MFIs in this study have been divided into 6 regions. They are: East Asia and the Pacific, Europe and Central Asia, Latin America, Middle East and North Africa, South Asia and Sub-Saharan Africa. The microfinance industry differs through the regions. Microfinance in Latin America and well developed, while it is not so mature in Africa. Europe is characterized by higher loan sizes. Appendix ?? provides more information on the Microfinance in different regions. Therefore adding a dummy variable for regions may help explaining the variance in the rating grades.

Table 10.3

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,817(a)	,667	,642	,1062

a Predictors: (Constant), Profit, Crisil, PAR30, Microfinanza, operexp_portf, SubSaharanAfrica, MiddleEast_NorthAfrica, EastAsia_Pacific, oper_self_suff, MicroRate, SouthAsia, ln_assets, Europe_CentralAsia, ln_loan_outst_ave, assets_rot, M-Cril

b Dependent Variable: rategrade1

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-,719	,144		-4,996	,000
	ln_assets	,084	,007	,551	11,381	,000
	PAR30	-,357	,057	-,309	-6,313	,000
	operexp_portf	-,150	,090	-,125	-1,677	,095
	oper_self_suff	,095	,028	,172	3,443	,001
	assets_rot	,246	,101	,173	2,423	,016
	ln_loan_outst_ave	-,011	,011	-,069	-1,041	,299
	MicroRate	-,086	,021	-,198	-4,080	,000
	Microfinanza	,059	,020	,146	2,984	,003

Crisil	,222	,078	,143	2,854	,005
M-Cril	,061	,045	,114	1,348	,179
EastAsia_Pacific	-,008	,045	-,014	-,186	,852
Europe_CentralAsia	,059	,023	,132	2,600	,010
MiddleEast_NorthAfrica	,029	,039	,036	,762	,447
SouthAsia	-,035	,060	-,048	-,589	,557
SubSaharanAfrica	-,037	,026	-,072	-1,447	,149
Profit	-,001	,017	-,003	-,071	,944

a Dependent Variable: rategrade1

The new model explains 66,7% of the variance in the rating grade (R^2). Taking into consideration that our study is made on the sample, the model explains 64,2% of the variance (adj R^2). This is an improvement, since R^2 had a value of 52,8% and the adjusted R^2 had a value of 51,5% in the regression model before dummies were added.

Let's first take a look at the dummy variables. Variable Profit that explains organization type is insignificant. Four out of five dummy variables for region show no significance either. These are East Asia and the Pacific (sig. 0,852), Middle East and North Africa (sig. 0,447), South Asia (sig. 0,557) and Sub-Saharan Africa (sig. 0,149). Only dummy for Europe and Central Asia was found significant (sig. 0,010). Adding a dummy for rating agencies had more effect. Only one dummy variable M-Cril is not significant (sig. 0,179). MicroRate indicates a negative relationship (B coefficient of –0,086 and sig. 0). Microfinanza (B coefficient 0,059 and sig. 0,003) and Crisil (B coefficient of 0,000 and sig. 0,005) indicate a positive relationship with the rating grade.

As in previous model, variable PAR30 has the highest B coefficient (-0,357). Standardized Beta coefficient shows, however, that variable ln_assets has the highest effect on the rating grade. Beta coefficient for ln_assets is 0,551 and for PAR30 is -0,309.

Now let's look at the significance of the remaining variables. Variables ln_assets, PAR30, oper_self_suff and assets_rot have sig. values below 0,05. Variable ln_loan_outst_ave is not significant like in the previous model (sig. 0,299). Significance value of variable operexp_portf has increased from 0,013 to 0,095. This above 0,05, so the variable is not significant at the 5% level anymore.

The P-P plot of regression standardized residual (figure ??) shows some slight deviations between the observed and expected cumulative probabilities. Besides that, the values fit the straight-line fine and the residual is normally distributed.

Figure 10.6

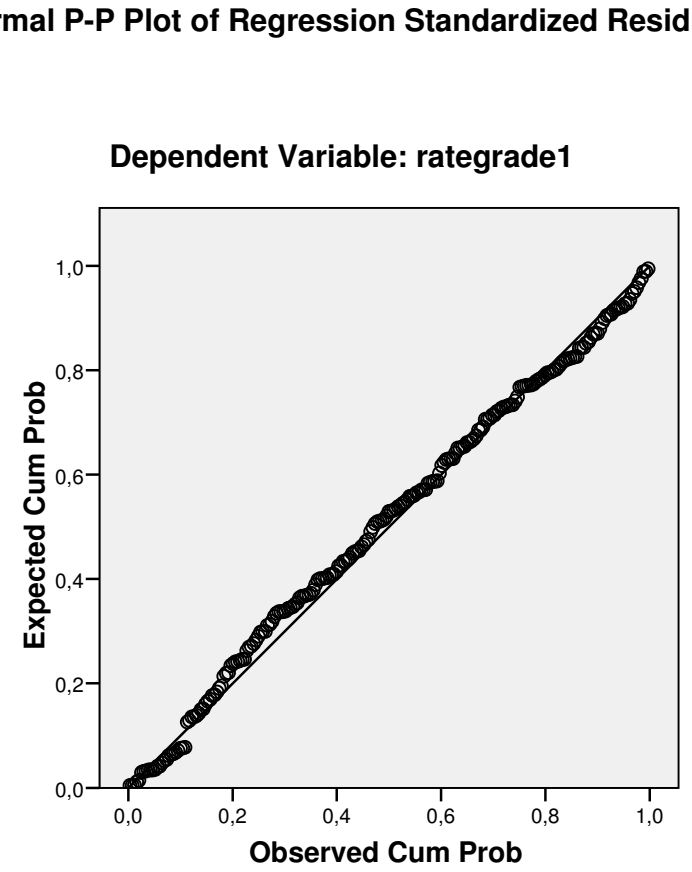
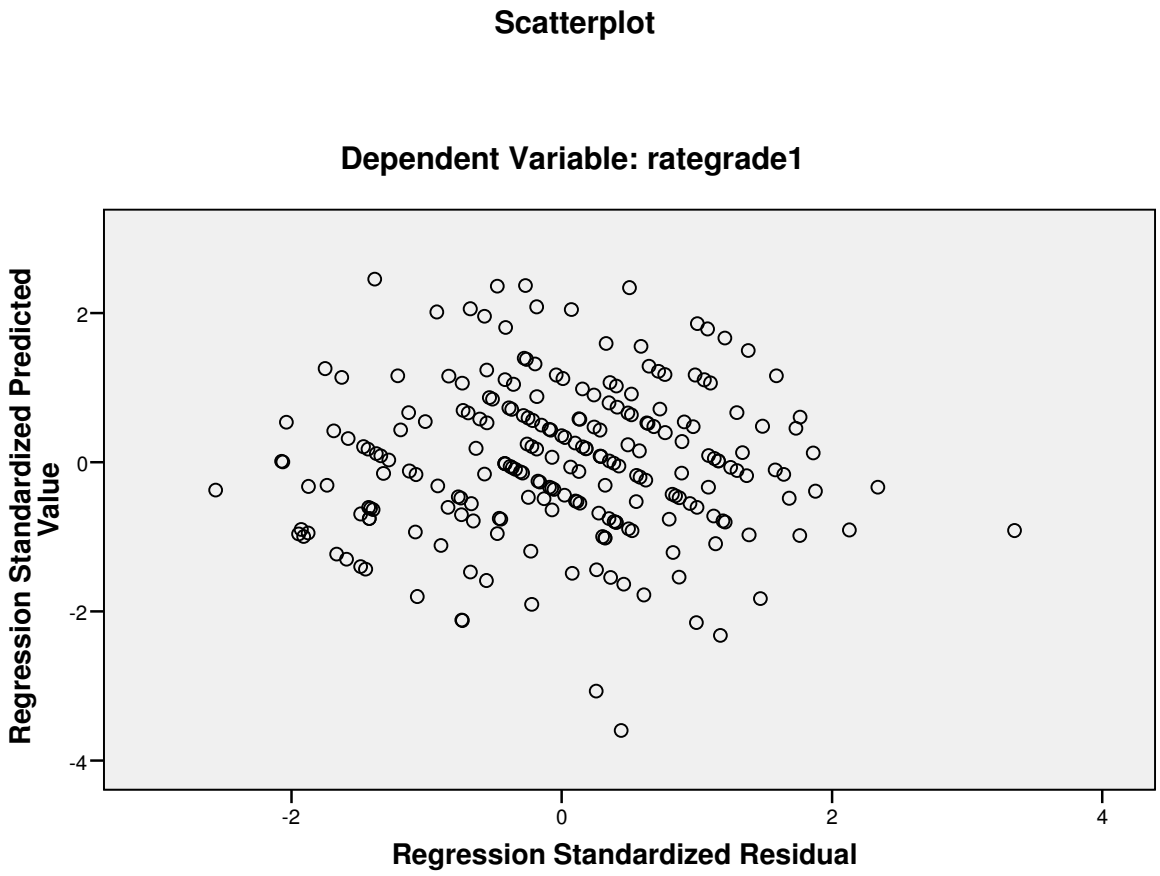


Figure ?? shows the scatterplot of the regression standardized residual. The values are scattered and no specific pattern is observed. The assumption of homoscedasticity is met.

Figure 10.7



Results from SPSS show that only half (8 out of 16) of the independent variables were significant in explaining the model. To improve our regression the following variables will be deleted: ln_loan_outst_ave, EastAsia_Pacific, MiddleEast_NorthAfrica, SouthAsia, SubSaharanAfrica and Profit. They all had sig. value above 0,05.

Deleting all insignificant variables from the model gave R^2 of 63,8% and adj R^2 of 62,5%. That is a decrease compared to the model with all the variables.

Table 10.4

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,799(a)	,638	,625	,1092

a Predictors: (Constant), Europe_CentralAsia, ln_assets, PAR30, oper_self_suff, assets_rot, Microfinanza, MicroRate, Crisil

b Dependent Variable: rategrade1

After deleting the insignificant dummy variables for region, agency and MFI type, variable operexp_portf became significant (table ??). The outreach measure remained insignificant (sig. 0,448). Therefore it was deleted from the model. Table below presents results from the regression with and without variable ln_loan_outst_ave. After deleting the variable from the model the significant values of other variables changed only slightly. All the variables remained significant and were kept.

Table 10.5

Coefficients(a)

Model		t	Sig.	t	Sig.
1	(Constant)	-5,273	,000	-5,939	,000
	ln_assets	11,687	,000	11,410	,000
	PAR30	-6,954	,000	-7,302	,000
	operexp_portf	-1,972	,050	-1,939	,054
	oper_self_suff	3,449	,001	3,688	,000
	assets_rot	3,177	,002	3,340	,001
	MicroRate	-4,453	,000	-4,380	,000
	Microfinanza	3,144	,002	3,129	,002
	Crisil	3,212	,002	3,550	,000
	M-Cril	2,002	,047	2,628	,009
	Europe_CentralAsia	2,612	,010	2,537	,012
	ln_loan_outst_ave	-,759	,448		
		With loan_outst_ave		Without loan_outst_ave	

All results from the new regression model are presented in table ??.

Table 10.6

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,809(a)	,655	,639	,1071

a Predictors: (Constant), Europe_CentralAsia, ln_assets, Crisil, M-Cril, PAR30, oper_self_suff, MicroRate, assets_rot, Microfinanza, operexp_portf

b Dependent Variable: rategrade1

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,761	,128		-5,939	,000
	ln_assets	,080	,007	,531	11,410	,000
	PAR30	-,374	,051	-,321	-7,302	,000
	Operexp_portf	-,156	,080	-,129	-1,939	,054
	oper_self_suff	,100	,027	,181	3,688	,000
	Assets_rot	,309	,093	,217	3,340	,001
	MicroRate	-,088	,020	-,203	-4,380	,000
	Microfinanza	,061	,019	,150	3,129	,002
	Crisil	,224	,063	,143	3,550	,000
	M-Cril	,064	,024	,118	2,628	,009
	Europe_CentralAsia	,054	,021	,119	2,537	,012

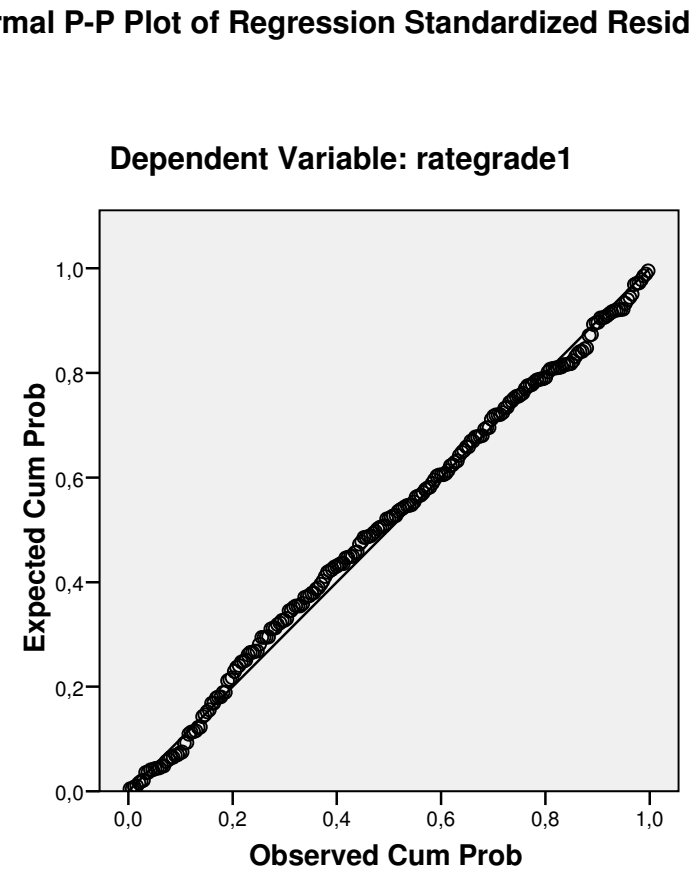
a Dependent Variable: rategrade1

The new model explains 63,9% of the variance in the rating grade (R^2 = 65,5% and adj R^2 = 63,9%). This is a slight decrease compared to the model with all independent variables, which explained 64,2% of the variance in the rating grade.
Variable PAR30 has the strongest B coefficient, while variable ln_assets has the strongest Beta coefficient followed by variable PAR30. This was the result in previous models too and was commented earlier.

The number of significant independent variables increased from eight to ten. The constant is also significant. Removing the variable from the model decreased the values of R^2 to 65,5% and adj R^2 to 63,9%.

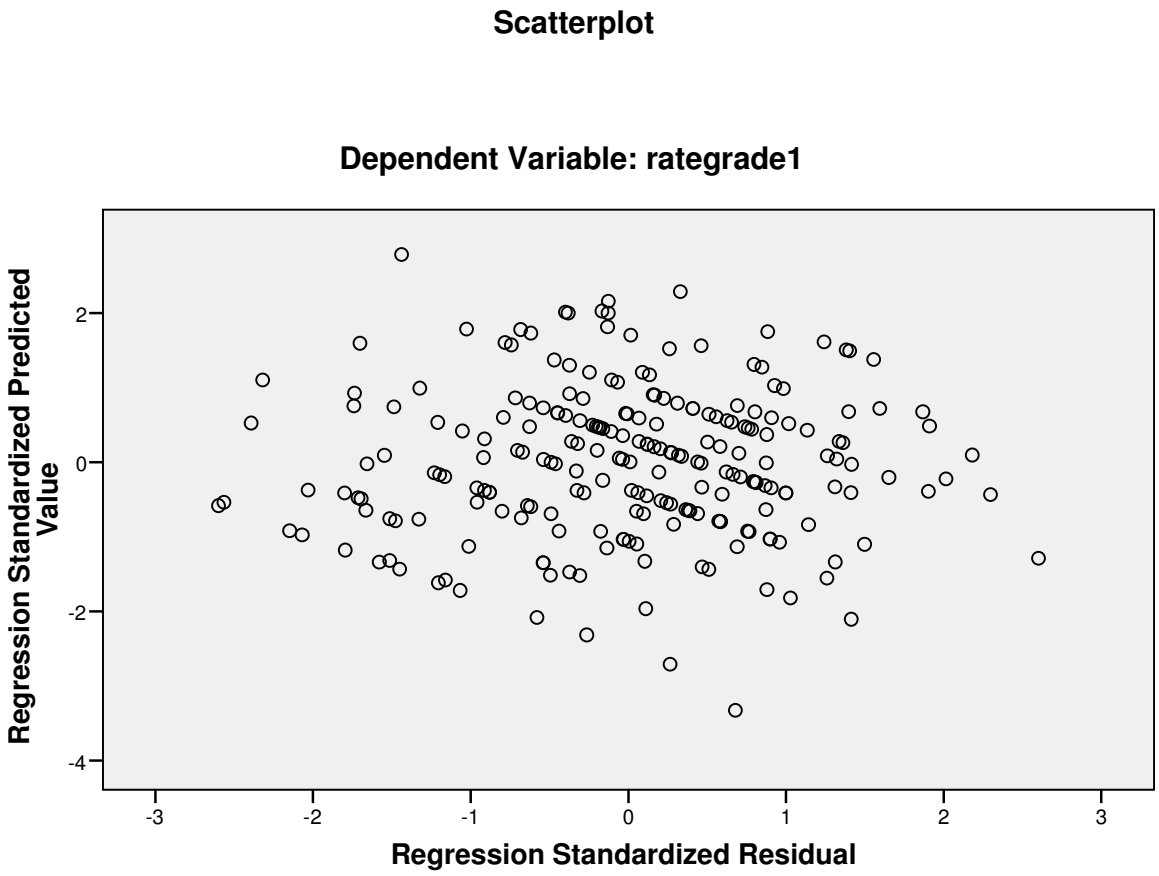
The normal P-P plot shows that our observed values of cumulative probability improved compared to the model when all variables were included. The observed values fit the line well.

Figure 10.8



Scatterplot represented below shows no specific tendencies and the assumption of equal variance is met.

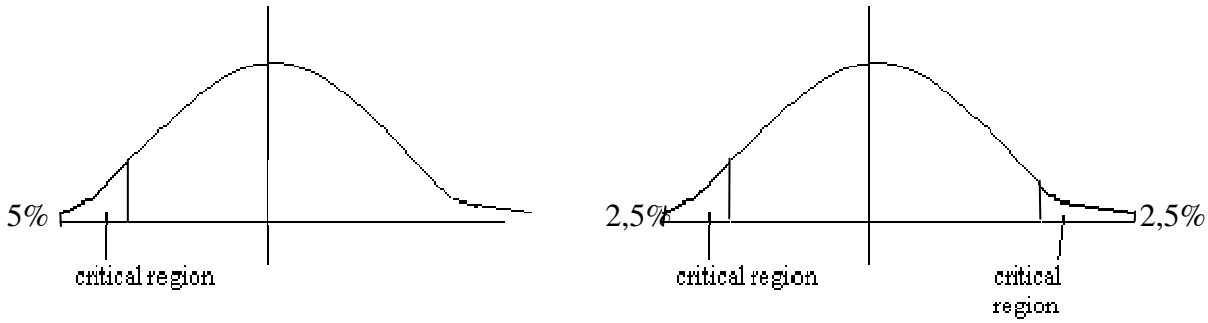
Figure 10.9


Scatterplot
Dependent Variable: rategrade1
Regression Standardized Predicted Value
2
0
-2
-4
-3
-2
-1
0
1
2
3
Regression Standardized Residual

11. Results

Before we ca reject or support our hypotheses, we should define our decision criteria. The probability between choosing the null and the alternative hypotheses is called significance level (Zikmund 2003). We should reject the null hypotheses if the relationship is significant and accept the null hypotheses if the relationship is insignificant. Now let's determine what type of test we will use. A one-tailed test is used to test the relationship and it's direction between the variables. That is whether the variables are positively or negatively related. A two-tailed test is used only to determine whether that relationship exists, and does not define its direction. A graphical illustration of a one-tailed and a two-tailed tests is provided below.

Figure 11.1



One-tailed test *Two-tailed test*

If test results fall into the critical regions, we reject the null hypothesis and accept the alternative hypothesis. These two tests can be done using different significance levels (ex. 1%, 5%). It is common to use a 5% significance level in social sciences. It means that there is a 5% chance to reject the null hypothesis even if it's true. If the p-value (0,050 for a 5% significance level) is less than the significance level, it will fall into the shaded area and the null hypothesis should be rejected. SPSS usually provides p-values based on a two-tailed test. If the t-value is below –1,645 (for negatively related variables) or above 1,645 (for positively related variables), then the null hypotheses should be rejected. In a one-tailed tests, the t-value has critical value of +/- 1,96 and does not depend on the direction of the relationship.
Since our hypotheses state the relationship and its direction between the variables, a two-tailed test will be used. As a decision criterion we will use a 5% significance level. To determine whether the variables are significant or not, we will use p-values and t-values.

Hypothesis 1: Size and Rating

$H_1$0: There is no relationship between MFI size and the rating grade.
H_1A: A positive and significant relationship exists between MFI size and the rating grade.

Variable ln_assets is used as a measure of MFI size. The B coefficient of 0,080 shows that the rating grade will increase by 0,080 if ln_assets increases by 1. This indicates a positive relationship between the variable and the rating grade. Variable ln_assets is significant at the 5% level with a significance value of 0,000 and t-value of 11,410. A positive significant relationship between the MFI size and the rating has been proven.

We reject the null hypothesis and accept the alternative hypothesis.

Hypothesis 2: Risk and Rating

$H_2$0: There is no relationship between MFI risk and the rating grade.
H_2A: A negative and significant relationship exists between MFI risk and the rating grade.

MFI risk is represented in its portfolio quality. Results from SPSS show that an increase in PAR30, which is a measure of portfolio quality, by 1 unit would cause the rating grade to decrease by 0,374 (B coefficient is –0,374). This indicates that the risk and rating grade are negatively related. The significance value is 0,000 (which is lower than 0,050) and t-value is -7,302. Therefore we can say that a significant negative relationship exists between MFI risk and the rating grade.

We reject the null hypothesis and accept the alternative hypothesis.

Hypothesis 3: Efficiency and Productivity

$H_3$0: There is no relationship between MFI efficiency and productivity and the rating grade.
H_3A: A positive and significant relationship exists between MFI efficiency and productivity and the rating grade.

Operating expense ratio measures the cost of providing loans. Thus lower ratio indicates higher efficiency. B coefficient of –0,156 shows that the rating grade will decrease by –0,156 if the ratio increases by 1 unit. Since lower ratio means higher efficiency, then efficiency is positively related to the rating grade. The results show a p-value of 0,054. The t-value of -1,939 is below the critical value of –1,654 for a two-tailed test for negatively related variables. Therefore the value is significant in explaining the model.
Variable operational self-sufficiency is a productivity measure. A value of 1 and above means that MFI is able to cover its costs from the revenue. The B coefficient is positive with a value of 0,100 showing that the value of the rating grade would change by 0,100 if the variable changes by 1 unit. This shows a positive relationship between the variable and the rating grade. Significance value is 0,000, which is below 0,050.
We conclude that a significant positive relationship exists between MFI efficiency and productivity and the rating grade.

We reject the null hypothesis and accept the alternative hypothesis.

Hypothesis 4: Profitability

$H_4$0: There is no relationship between MFI profitability.
H_4A: A positive and significant relationship exists between MFI profitability and the rating grade.

Variable assets rotation was chosen as an indicator of MFI profitability. An increase in the variable by 1 would cause the rating grade to increase by 0,309 (Beta coefficient 0,309). This shows a positive relationship with the dependent variable. Significance value is below 0,50 (sig. 0,001) and the t-value is above 1,654 (t 3,340). The variable is significant in explaining the model at the 95% confidence level.
A significant positive relationship between MFI profitability and the rating grade has been proven.

We reject the null hypothesis and accept the alternative hypothesis.

Hypothesis 5: Social Performance

$H_5$0: There is no relationship between MFI social performance and the rating grade.
H_5A: A positive and significant relationship exists between MFI social performance and the rating grade.

Loan outstanding average was chosen as a measure of outreach. The smaller the loan sizes, the poorer the clients that are served by the MFI. Thus a negative relationship between the variable and dependent grade would indicate that social performance has positive effect on the rating grade. Since the variable was not significant, it was deleted from the final model. However I would like to comment the results of the findings in the model with all variables (table ??). The B coefficient of –0,011 shows that the rating grade would drop by 0,011 if the variables increased by 1. In other words providing loans to poorer customers would increase the MFI rating grade. This relationship was however not found significant (sig. 0,299 and t –0,759). The model before the control variables were added shows an insignificant positive relationship (B coefficient 0,003 and sig.0,706) (table ??). The final model with the variable shows an insignificant negative relationship (B coefficient -0,00 and sig.0,448). (table ??).
The model did not prove that there exists a significant positive relationship between social performance and the rating grade.

We accept the null hypothesis and reject the alternative hypothesis.

12. Discussion

In this part of the paper we will take a closer look at the results of the model. We will discuss whether empirical testing confirmed our hypotheses. The influence with regard to each of the variables in the regression will be discussed. We'll compare the results with previous studies.

To test whether our hypotheses are confirmed by the data, we used multiple regression analysis. As discussed in previously, the multiple regression equation has the following form:

$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_{3+\ldots+} \beta_n X_n + e$ *(Zikmund 2003)*

Now let's fill inn the computations from this study. All information will be taken from table ??, that shows the results from the final regression model. The full model was based on 16 variables. Six of these variables were used in the hypotheses, the remaining 10 were used as control variables. After substituting the variables from our final model, the equation looks like this:

$Rating = \alpha + \beta_1 ln\_assets + \beta_2 PAR30 + \beta_3 operexp\_portf + \beta_4 oper\_self\_suff + \beta_5 assets\_rot + \beta_6 MicroRate + \beta_7 Microfinanza + \beta_8 Crisil + \beta_9 MCril + \beta_{10} Europe\_CentralAsia$

The final equation consists of 10 variables. The empirical testing showed that they are significant in explaining the variance in MFI rating grade. β coefficients measure the effect of each individual variable. A negative coefficient means that an increase (decrease) in the variable will cause the rating grade to decrease (increase). A positive coefficient means that an increase (decrease) in the variable will cause the rating grade to increase (decrease). The equation after adding β coefficients is presented below:

$Rating = -0{,}761 + 0{,}080 * ln\_assets - 0{,}374 * PAR30 - 0{,}156 * operexp\_portf + 0{,}100 * oper\_self\_suff + 0{,}309 * assets\_rot - 0{,}088 * MicroRate + 0{,}061 * Microfinanza + 0{,}224 * Crisil + 0{,}064 * MCril + 0{,}054 * Europe\_CentralAsia$

Let's do some computations to find out the rating grade based on the mean values of our variables. Most of the MFI in our data are non-profit and operate in Latin America. Planet Rating performed their rating, therefore control variables will have a value of 0.

*Rating = -0,761 + 0,080*15,236 – 0,374*0,410 – 0,156*0,502 + 0,100*1,181 + 0,309*0,266 – 0,088*0 + 0,061*0 + 0,224*0 + 0,064*0+ 0,054*0 = -0,761 + 1,219 – 0,153 – 0,078 + 0,118 + 0,082 = 0,427*

We'll refer to the rating of 0,427 as a basic rating. Let's take a closer look at the effect of each variable and compare it to our hypotheses. To see how each variable influences the rating, we'll use examples with minimum, maximum and mean values of our variables.

Size

Our alternative hypotheses states that MFI size is positively related with the rating grade. Results of our study support this(β = 0,080). An increase in ln_assets by 1 would cause the MFI rating to increase by 0,080. Though the β coefficient is rather small, size is the variable that affects the rating the most (Beta 0,531, t 11,410).

Positive relationship between size and rating is also supported by previous studies. Larger MFI tend to get higher ratings. They should be better in meeting their commitments and managing risks. Larger MFI usually benefit from economies of scales and have experienced staff.

Risk

Our regression model shows that portfolio at risk is negatively related to the rating grade (β = -0,374). High values of portfolio at risk indicate that a high number of loans is overdue (over 30 days for PAR30). Such MFI will suffer from low portfolio quality and will be considered more risky. The results from regression model confirmed our alternative hypotheses. An increase in portfolio in risk will cause the rating grade to decrease.

An MFI that has no portfolio overdue (PAR30 = 0) will get a rating grade that is 0,187 points higher compared to an MFI with half of it's portfolio overdue 30 days (PAR30 = 0,5) if all the other variables are the same (-0,374*0 - (-0,374*0,5) = 0,187).

Efficiency and Productivity

Our hypothesis states that efficiency and productivity are positively related to the MFI rating grade. The lower the operating expense ratio, the higher the efficiency. Let's look at the effect of high efficiency and productivity on the rating grade. To do a comparison, we'll use mean and a minimum value for variable operexp_portf and a maximum value for variable oper_self_suff . The rating grade of an MFI with maximum efficiency and productivity compared to the mean would be 0,168 points higher (0,208-,04) if all other variables are equal.

Rating = -0,156*,502 + 0,1*1,18 = 0,04 mean efficiency and productivity

Rating = -0,156*0,168 + 0,1*2,34 = 0,208 max efficiency and productivity

The results from the model confirm the alternative hypotheses.

Profitability

We used assets rotation as a measure of profitability. The results of the research show that the variable is positively related with the rating grade. Let's look at an example using mean and max profitability values. It will help us to compare the rating grade of an average MFI and the one with maximum profitability using the values from our data. An MFI with max profitability will have a rating grade than is 0,113 points higher than an MFI with mean profitability from our data (0,309*0,630- 0,309*,266 = 0,113). This is also supported by our hypotheses.

Outreach

The alternative hypothesis stated that outreach was positively related to rating. The empirical testing did not prove this and the null hypothesis was accepted. Though the variable ln_loan_outst_ave was not significant, the β coefficient was negative in the full model and before it was deleted from the final model. It was, however, positive in the model before control variables were added. This is, of course, not a result worth making an estimation, but there might be a tendency for MFI with higher outreach (thus lower variable) to get higher ratings.

Previous studies find positive relation between companies' social and financial performance. (Margolis and Walsch, 2001). Gutierrez-Nieto and Serrano-Cinca (2007) study try to prove that social performance has positive effect on the MFI rating, but find no empirical evidence for that.

Due to a unique nature of MFI aiming to meet "the double bottom line" (social and financial goals), I believe that outreach should affect the rating grade. This model did not prove this. Since rating reports done by different agencies do not provide the same amount on social performance, using different indicators could give different results.

Control variables

Region

To check for the possible effect of the region where the MFI operate we added a control variable to our regression model. Out of six regions, only Europe and Central Asia was significant. The results of our study show that if an MFI operates in that region, the rating grade will be 0,054 points higher compared to MFI that operates in other parts of the world (if other variables are the same). With a basic rating grade of 0,427, the new rating grade would then be 0,481. None of the other regions were significant in explaining the model. Our data had a very high number of cases from Latin America (46%). The number of MFIs from Europe and Central Asia was also rather high (19,1%). Testing the model on a sample with more cases from other regions could give different results. Income, education and political situation in the region may influence the results.

Agency

Since the ratings were performed by different agencies another control variable for agency was added to our model. All of the dummy variables are significant in explaining the model. Let's look at the effect of each agency. Remember that our basic rating grade was calculated for an MFI rated by Planet Rating. Then a rating performed by MicroRate will be 0,088 points lower that is 0,339. Microfinanza will provide a grade of 0,488, which is 0,061 points higher. Crisil will give a rating that is 0,224 points higher from our basic model. This rating grade of 0,651 is the highest compared to the other agencies. We had only a few cases rated by the agency, so the effect could be different if more cases were added. If M-Cril performs a rating instead of Planet Rating in our basic model, then the rating grade will be 0,064 higher with a value of 0,491. As we notice, adding a control variable for agencies was useful in explaining the MFI rating. There are a few possible explanations to this effect. One is that the rating scale used to transform the grades could explain the difference in the grades. Another one is that different agencies give more weight to some indicators compared to others. We already discussed in our paper that the agencies use different methodologies.

Type

The last control variable in our model is profit. It wasn't significant in explaining the relationship and was deleted from our final model. This means that it doesn't affect the rating grade whether the MFI is non-profit or for profit. Only data on MFI from Latin America was used. Our study used MFI from all over the world and found no relationship between the non-profit/profit motive and the MFI rating. The basic rating in our model would be unchanged with a rating grade of 0,427.

13. Conclusion

Microfinance rating is an important step on the way to transparency. Donors, investors and MFI clients need accurate and reliable information about MFI performance. Ratings would help MFI to benchmark and compare their performance with peers.

In order to find what factors influence the rating of the MFI, an empirical research was conducted. To do this we defined 6 hypotheses based on theory and previous findings. These stated the relationship between the rating grade and the following factors: MFI size, risk, productivity and efficiency, profitability and outreach. Our data was based on the rating reports by 5 major rating agencies. The MFI rated were located in different countries. Therefore control variables for agency and region were added. With the growing tendency towards organizing (or transforming) MFI as for profit institutions, one more control variable was added. It would measure the possible effect of non-profit motive.

The results of empirical research showed that MFI size has the most effect on the rating grade. It is positively connected to the rating grade showing that larger MFI tend to get better rating grades. Risk is the measure that explains the next most variance in the rating grade. Its β coefficient is negative, so riskier MFI get lower rating grades. Efficiency, productivity and profitability measures were significant in explaining rating grades. They all showed positive relationship as stated in the hypotheses. The model did not, however, prove that there exists a significant positive relationship between social performance and the MFI ratings. The variable was not found significant and was deleted from the final model. Possible explanations of that were discussed in previous chapter. Analysis showed that adding control variables for agency were helpful in explaining the variance in the rating grade. All of the dummy variables were significant. It didn't affect the rating grade whether MFI were non-profit or profit motivated. A positive significant relationship was found between the MFI from Europe and Central Asia. None of the other regions were significant in explaining the model.

Larger, less risky, more efficient, more productive and more profitable MFI tend to get better rating grades. It doesn't matter how they are organized (profit motivated or not) or what region they operate in (except for Europe and Central Asia that has positive effect on the rating grade). It does, however, matter what agency performed the rating. We should be careful about making a conclusion, since transforming rating grades into a standardized scale could've caused that.

14. Critics

Not much research is done on the MFI ratings. Many of the previous studies used in stating the hypotheses come from theory on bond ratings, bank ratings, social performance of firms. Usage of more theory and empirical studies on MFI ratings could possibly help us to identify other important factors that influence the rating grades assigned to MFI.

The data used in this research came from rating reports available for publicity through the Rating Fund. It is possible that there is a higher number of the MFI that needed to be rated (due to government regulations or request from funders) than those that did it voluntary.

Five major rating firms performed the ratings. They are not equally represented. Planet Rating did 37,9% of the rating reports, while Crisil did 1,3%. All agencies, but one operate globally. Crisil operates in South Asia only.

The number of cases between the regions is not equally distributed either. Almost half of the MFI in the data operate in Latin America compared to approximately 5% that operate in Middle East and North Africa.

Previously not all rating reports included a rating grade. The ones without an overall rating grade were not used in the study.

Only indicators that were available through rating reports for all agencies were used. Improving the reports and providing information could help to find the variables that would improve the results.

The research was conducted assuming that all the data in the rating reports was correct. The MFI could provide untrue or withhold some information in order to achieve a better rating.

More research on the microfinance ratings should be carried out. A special attention should be given to social performance. Finding better indicators could give different results. When controlling for region and agency effects more data should be used, so no variables are clearly outnumbered.

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