

# The efficiency of Microfinance Institutions compared to Norwegian Savings Banks

Looking outside the industry in the pursuit of Microfinance efficiency and sustainability

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

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## **Abstract**

Microfinance institutions (MFIs) are seeing high growth in their industry, but faces challenges when it comes to financial viability. The Norwegian savings banks have one of the world's most efficient banking systems and have focused on cost-efficiency over a period of 50 years. We examine the possibilities for MFIs being more efficient by learning from Norwegian savings banks. We employ a large dataset of 473 MFIs from 77 different countries spanning 15 years, and 81 Norwegian savings banks spanning 20 years.

We find that both industries statistically improve their efficiency with time by reducing operational expenses in percent of total assets. As the operational expenses decrease with time, we additionally test the effect of the MFIs' age in relation to this decrease. Our panel regressions show that the age of an MFI affect neither operational expenses, nor portfolio yield. This result provides reasons to believe that age does not affect the operational expenses. Further, we find differences in the financial statements and ratios, whereas Norwegian savings banks tend to be more stable, while MFIs are converging towards them. Lastly, we find that technology, domestic cooperation and alliances are the primary actions contributing to the low cost structure in Norway, and that MFIs can learn from this.

## Preface

This thesis represents the end of our master in Business and Administration and the time at University of Agder. The thesis is written on the basis of our main profile, financial management.

The work with our thesis has both been demanding and challenging, but at the same time incredibly educational. Financial management and strategic analysis are fields that have been of interest, and in combination with microfinance and the Norwegian banking industry have made them particularly interesting. Our thesis compares the two industries, which makes it the first to cover this particular topic. Important changes are taking place in the microfinance industry and it will be interesting following the development in the time to come.

Working together has been fun, challenging and educational. We have spent a tremendous amount of time on discussions and believe this has yielded us a nuanced understanding of both the microfinance and Norwegian savings bank industries. We are grateful for all help received throughout this thesis and we would not been able to complete it successfully without this help. We want to thank Celeste Ximena De la Huerta Nunez for discussions and help with development of our applied methodology. We also want to thank our study group for great discussions during this semester and especially Anders Melleberg Torp who also help with the development of the applied methodology.

Lastly, we wish to thank our supervisor Roy Mersland with his background in microfinance and Norwegian savings banks. Roy has been an important resource throughout the thesis, both in terms of feedback, constructive criticism and useful suggestions.

Jonas Opperud



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# 1 Introduction

## *1.1 Background*

The microfinance market is seeing high growth in their industry. Microfinance institutions, MFIs, reporting to mixmarket.org have revealed that there has been a growth in both the loan portfolio and for individual MFIs. Mersland and Strøm (2012a) reported that, in the period 1999-2009, the growth in average loan portfolio has been 41.5% and annual growth for the individual MFIs were 14.3%. While the microfinance industry is seeing a high growth, there are major concerns in the industry about financial viability. Additionally, as the microfinance industry is coming of age, came the claim that the industry was abandoning the mission to serve the poor (Ditcher & Harper, 2007; referenced by Mersland & Strøm, 2010b). Mersland and Strøm (2010b) found that that the more cost efficient an MFI was, the smaller the average loan. From this they made a prediction that further efforts to reduce costs would result in MFIs reaching out to even poorer segments, when profitability was at the same level. This illustrated the importance of achieving higher efficiency in microfinance. Moreover, concerning the financial viability, Dieckmann, Speyer, Ebling, and Walter (2007) estimated that in 2006 only 1 – 2% of all MFIs in the world were financially sustainable, meaning they did not rely on outside subsidies. While, MicroBanking Bulletin (autumn 2007) revealed that 41% of microfinance institutions were not financially sustainable and were relying on subsidies (Mersland & Strøm, 2010b).

The interest yield is affected by several determinates whereas the largest are operational expenses. In 2011, the yield was on average 26.9% (Rosenberg, Gaul, Ford, & Tomilova, 2013) and as one of the main keys to achieve higher efficiency, MFIs must reduce their interest yield (Hug, 2014). Microfinance is a labour-intensive business (Mersland & Strøm, 2014), and the possibilities for cost reductions are tremendous. The innovations in microfinance have mainly been focusing on reducing the risk through new lending methods. Morduch (1999) claimed that we are awaiting a new wave of innovations. However, Mersland and Strøm (2012b) said that instead of a new wave, the expansion of already implemented and functional innovations were needed. ResponsAbility (2016) interviewed several industry experts saying that technology has the power to change microfinance. They further forecasted that branchless banking and mobile money are the trends that will transform the industry. Norwegian savings banks had a huge leap in technological enhancements starting with the development of electronic payment systems in the beginning of the 1960s (Forsbak & Sparebankforeningen, 2004). Today, they possess some of the most innovative and efficient online solutions, where development is led by alliances such as the Eika group, resulting in shared development costs among the banks. Microfinance needs to look



outside their own industry in search of new ways of improving their service in the pursuit of sustainability and efficiency.

## *1.2 Motivation*

There is little to no previous research on the comparison of microfinance institutions against Norwegian savings banks. This was a huge motivational factor when deciding upon this subject. Furthermore, the microfinance industry has been under criticism the last decade, which also contributed to peak our interest for this subject. After watching the NRK Brennpunkt documentary criticising the high interest rate for micro-loans it was evident that the high cost of issuing these loans are not beneficial to the borrowers. It will therefore be interesting to compare one of the world's "best" banks against the "worst" to see where microfinance can improve their business and services.

## *1.3 Objective and Research Problem*

The objective of this thesis has been to research and identify possibilities for microfinance institutions to be more efficient by learning from Norwegian savings banks. Firstly, we test whether microfinance institutions are becoming more cost-efficient with time. Additionally, we run regression analyses to test if age affects the efficiency. Furthermore, we want to illustrate the differences between microfinance institutions and Norwegian saving banks. We will do this by comparing an excerpt of the financial statements and the trend of some selected accounting ratios. Additionally, we hope to show that Norwegian saving banks are becoming more cost efficient, even though they already are one of the most cost efficient banks in the world. From this we hope to find an indication for what microfinance institutions can focus on in the future, and if some features are transferable from Norwegian savings banks to MFIs. This is important because microfinance institutions are troubled with financial viability and high costs.

The objective of the thesis is well suited since microfinance institutions and Norwegian savings are both operating in the banking industry. The Nordic banks are one of the most cost-efficient banking industries in the world (Little, 2007; Studemann, 2007; The Economist, 2013), and getting more efficient, while MFIs are on the opposite scale. As already mentioned, microfinance struggles with financial viability and high cost. This gives a good base for identifying and researching the possible factors that may be transferred from Norwegian savings banks to MFIs.

The research question for this thesis is therefore:

**Can microfinance institutions become more efficient by learning from Norwegian savings banks?**

To help answering the research question we have divided it into three sub-questions:

1. Are MFIs becoming more efficient over time?
2. How do MFIs compare against Norwegian savings banks?
3. What have Norwegian savings banks done to become so efficient and can these innovations be transferred to MFIs?

We will start with constructing a graph illustrating the development of the operational expenses of the MFIs to test whether they become more efficient with time. We utilize operational expenses as they are the largest determinant of the interest yield in microfinance (Rosenberg et al., 2013). To be better able to compare the two industries against each other we will use the operational expenses in percent of total assets. Afterward, we will conduct a panel regression with age as the independent variable to estimate whether the age of an MFI has an effect on the operational expenses and portfolio yield. Thereafter, we are going to compare financial figures and ratios for both MFIs and Norwegian savings banks to indicate differences between the two industries. In the last part of the analysis, we will look at the Norwegian savings banks and the possibilities for transferring their focus on cost reduction and technological developments over to the microfinance industry.

#### *1.4 Structure*

This thesis is structured into nine sections. Section two describes the trends in the industries. Section three outlines the theory and literature review for microfinance and different aspects on the matter and lastly a brief review of developments in Norwegian savings banks. All the theory is summarized in section four and concludes the justification of the hypotheses. Thereafter, the data, variables, regression and ratios used in the analysis and the methodology discussed, are presented in section five and six. Section seven present the analyses and findings, whereas the discussions of the findings are found in section eight. The last section is the conclusion where weaknesses and the need for future research are identified.

## 2 Industry Trends

Efficiency is very important for microfinance institutions as mentioned by Mersland and Strøm (2010b). They said that efficiency was an element for dealing with the problem of financial viability and to uphold the social mission. Additionally, efficiency is the key driver for lower interest rates in microfinance (Hug, 2014). Further, Hug (2014) indicated that the achievement of higher levels of operating efficiency allows MFIs to charge lower interest rates on a sustainable basis.

*Roberto Andrade (Banco Solidario and PUCE, Ecuador)*

*“Efficiency will be very important next year. Institutions that manage to reduce costs intelligently will do well; others will struggle.” (ResponsAbility, 2016, p. 25)*

The Microfinance Market Outlook 2016 by ResponsAbility (2016) conducted several interviews with microfinance experts, where most said that branchless banking and mobile money is the new innovations that will transform the microfinance market. The interviews also revealed that these technologies were most prominent for all regions. “Technological advances will boost institutions efficiency and outreach capacity, allowing them to provide better services to their clients at lower costs” (ResponsAbility, 2016, p. 19). Branchless banking and mobile money were listed before broader range of services and credit scoring. Many researchers have argued that credit scoring is necessary for the microfinance market (Armendáriz & Morduch, 2010; McIntosh & Wydick, 2005). However, the market outlook paper by ResponsAbility (2016) found that credit scoring is not as important as branchless banking and mobile money, which they considered to be the next trends in microfinance.

This focus on efficiency relates to the DNB<sup>1</sup> announcement earlier this year. DNB adjusted their branch structure due to the changes in customer behaviour. February 3rd 2016, DNB published a press release covering adjustments to the new banking reality. The pace of the digital banking revolution is much faster than expected and DNB said that 85% of the Norwegian banking customers no longer visit the bank branches for everyday banking. The changes will reduce the number of branches from 116 to 57 during the first six months and will further reduce 600 full-time positions (DNB, 2016). Other Norwegian banks also following the implemented action taken by DNB, e.g. Sparebanken Vest, reduced 100 full-time positions by closing nine branches (Dagens Næringsliv, 2016a) and Sparebank1 BV reduced 24 full-time positions (Dagens Næringsliv, 2016b).

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<sup>1</sup> DNB = the largest Norwegian savings bank

A report from Finance Norway studied the Norwegian people’s banking behaviour, called the “daily banking survey”. We have taken two graphs describing Norwegian customers’ behaviour in terms of how often they visit local branches and the use of mobile banking.

### Filialbesøk 2002-2016

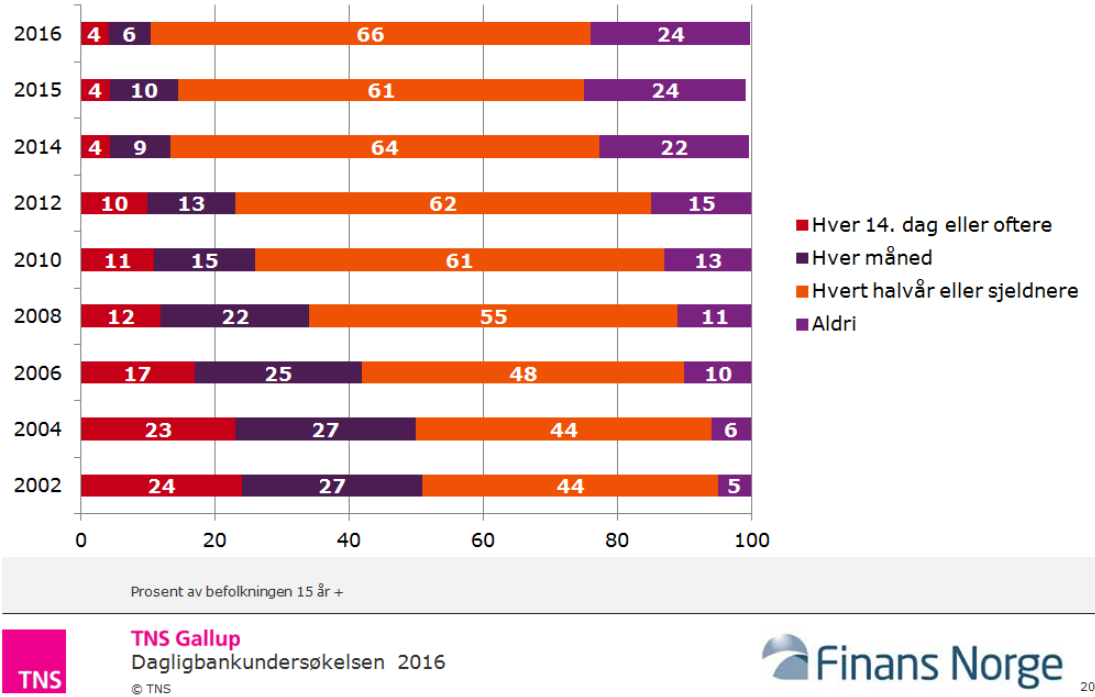


Figure 1: Local branch visits by Norwegian bank customers from Finance Norway (2016).

Figure 1 illustrates the development in Norwegian customers’ behaviour in term of how often they visit their local bank branches. In 2002, 49% visit their local bank branches once every half a year or even less frequently. In 2016 this ratio has increased to 90% and only 10% are visiting their local bank branches once every month or more.

Norway reduced their bank branches with 51 offices in total from 2014 to 2015, and in 2016 further bank branches are announced to be reduced (Finance Norway, 2016).

## Bruk av mobilbank

Hvor ofte bruker du din hovedbanks mobilbank?

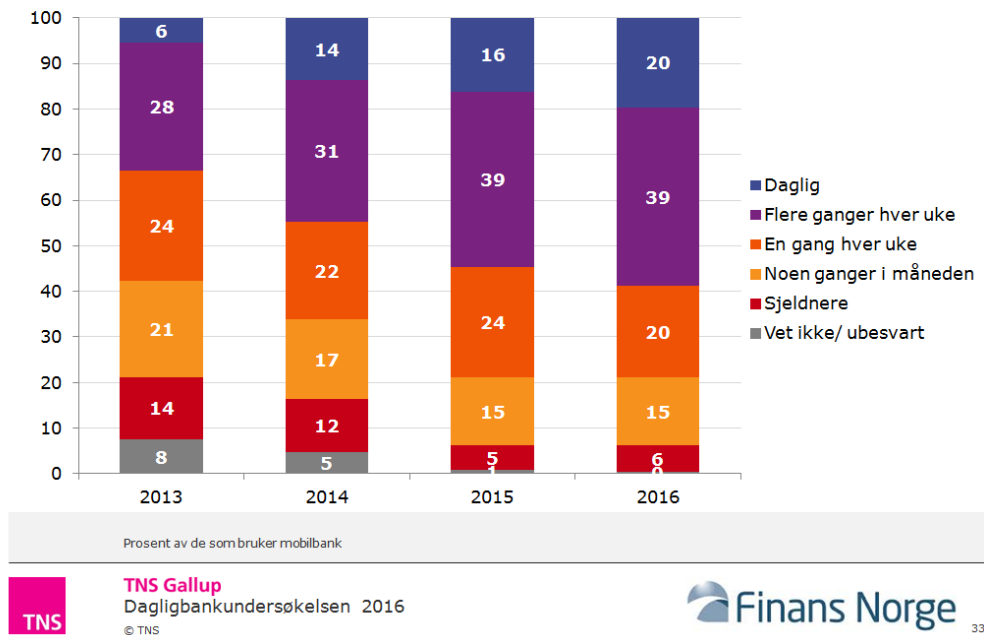


Figure 2: Usage of Mobil banking by Norwegian bank customers from Finance Norway (2016).

Norwegian customers are more frequently using their mobile phone for banking. In 2014, 39% of the Norwegian population above 15 years were using mobile banking. This ratio has increased to almost 50% in 2016. Of those, almost 60% are using mobile banking several times a week, and almost 80% at least once a week.

Norway has one of the world's most cost-efficient banks in the world (Little, 2007; Studemann, 2007; The Economist, 2013), but they are striving to be even more efficient. Norwegian consumer behaviour changes over the years, but as you can see, Norwegian savings banks quickly adapt to the changes in the market. They strive to be even more efficient so they can keep up with the competitive market. This is why it is relevant for microfinance to learn from Norwegian savings banks.

### 3 Theory and Literature Review

In this chapter of the thesis, we will present the theoretical framework. It starts with describing earlier research on the impact age has on microfinance. To better understand the role of age, we also include earlier research on the market development phases and cost drivers. Cost drivers include economies of scale, experience, learning and technology, and are all relevant to a firm's growth. Next we present earlier research and theory on what determines the interest rate, competition and efficiency. All theories are used in the thesis analysis and discussion when comparing the industries. Lastly, we outline developments done by the Norwegian banks, and the innovations in the microfinance industry. This is to better understand the developments in Norway that have created such a cost-efficient banking industry and are used when discussing what may be transferable to microfinance institutions.

#### 3.1 Age

Previous research on the age of microfinance is relevant to this thesis, since it is related to research question one, and our hypotheses about how age and time affect operational expenses and efficiency, which can be seen in section 4.

Standard economic theory give us the expectations that, in young industries, costs will improve as firms or the industry grows and acquires more experience. When the efficiency lessons have been learned, the learning curve will flatten out. After this point, the efficiency improvements will increase slowly, if at all in the absence of technological improvements (Rosenberg et al., 2013).

Caudill, Gropper, and Hartarska (2009) stated that the general expectations that a firm should improve with time, *ceteris paribus*, were both an understatement and an oversimplification for MFIs. González Vega (1998) referenced by Caudill et al. (2009, pp. 652-653) mentioned benefits with the passage of time:

1. The lending technology is proven and improved through several years of experimentation, development, and adjustment
2. The MFI accumulates a stock of information capital about the clientele and the environment
3. The MFI develops client relationships and identifies well-performing clients
4. The MFI accumulates the human capital embodied in an experienced staff
5. The MFI acquires a reputation as a serious organization capable of sustaining relationships with clients
6. The MFI has likely established connections with international networks and enjoys the resulting technology transfers.

Then Caudill et al. (2009, p. 653) mentioned possible reasons for why costs may flatten or even increase with time:

1. Screening and monitoring costs may rise as MFIs reach beyond their initial target group
2. Operational expenses may increase if MFIs move into more isolated and rural markets
3. Operational expenses could rise if MFIs begin competing in increasingly saturated markets
4. Higher collection costs may be associated with a possible culture of non-repayment and may be experienced if the MFI has to address increasing default rates
5. Village banking methods may simply replicate costs as they are extended into new areas.

The research of Caudill et al. (2009) indicated that MFIs generally operate more cost efficient over time. In the Eastern Europe and Central Asia region, half the MFIs became more cost efficient, while the other half did not. The Eastern Europe and Central Asia are somewhat different from Microfinance institutions elsewhere in the world, as they are among the youngest in the microfinance industry and their performance ranks among the best (Berryman, 2004; referenced by Caudill et al., 2009). The group that is becoming more cost efficient with time is relying less on subsidies and more heavily on deposits as a source of loanable funds. The microfinance institutions that were not in a network also tended to improve. Additionally, MFI located in Central Asia were more likely to improve than those in Eastern Europe.

Rosenberg, Gonzalez, and Narain (2009) found that age of a microfinance institution is strongly associated with lower operational expenses, even after separating out the effects of loan size, scale and other relevant variables, although the effect weakened over time. Operational expenses in percent of loan portfolio tended to drop by 2–8 percentage points for each of the first six years, then 1–2 percentage points for each of the next five years, and less than 1 percentage point for each year thereafter.

### *3.2 Market Development Phases*

Mersland and Strøm (2012b) stated that the development of microfinance had the traits of an industry in its take-off phase. This is a phase with strong, persistence growth over several years.

Porteous (2006) described the effects of competition in four different market development phases, which can relate to the statement made by Mersland and Strøm (2012b).

Market Characteristics	Market phases			
	1. Pioneer	2. Take-off	3. Consolidation	4. Mature
<b>Growth in volume</b>	May be slow	Rapid	Positive but slowing	steady natural growth
<b>Number of firms</b>	One or a few	Increases rapidly	Reduces from peak because of consolidation	Depends on characteristics of the product and market
<b>Market structure</b>	Concentrated	Fragmented, although market leader emerges	Concentrating; clear market leaders emerges	Maker leaders dominate
<b>Arenas of competition</b>	Little competition except as to location of distribution points	product characteristics and service levels	Price	Brand (including pricing)

Table 1: Competition through Market Development Phases (Porteous, 2006).

Porteous (2006, p. 3) simplified description “highlights the fact that competition is present throughout a firm’s existence. The competitive behaviour of firms change in response to customer’s needs and other firms’ actions”

Starting with the first phase, the pioneer phase. This is when a small number of providers with limited reach introduce a product in a market. In this phase, the growth might be slow and there will be little competition.

If the earlier pioneers have visible success, other firms will quickly enter the market and the market moves into the second phase. The second phase is the “take-off” phase, which indicated by Mersland and Strøm (2012b) was where the microfinance industry belongs. As the volume and visibility of products grow, firms primarily compete for improvement of the product to better suit customers and by enhancing service levels.

The market, as a whole, starts to show saturation at the current price level as a result of the rapid growth in the second phase. Growth may decline and the market enters the third phase, consolidation. Competition in this phase is in the pricing area, to allow new customers to participate. By the time firms reach this point, they have grown in scale and lowered their costs, which create profits that are allowing them to reduce costs. Firms that are not able to develop low cost structures may be forced out of the market. The competitive strategy changes from being supply driven to becoming demand driven, where firms are forced to respond to clients’ needs.

After firms with unsustainable, high cost structures are forced out of the market, a mature market emerges. The mature market has a stable numbers of firms and grows only as fast as external variables such as demographics, allows. The competition generally focuses on brand; customer



experience with service, price, place and product. Average prices may drop even further if greater efficiencies are achieved through economies of scale.

The mature phase is generally not the end of the story for most markets. Technological and business model innovations may disrupt current market structure by introducing new competitive behaviour, causing the cycle to repeat.

### *3.3 Cost Drivers*

Traditionally, production volume was the primary variable for cost behaviour. During the 1980s new variables that could drive costs were developed. Nowadays, it is recognized that costs are driven by many different factors (Banker & Johnston, 2006). The following presents an excerpt of Michael Porter (Porter, 1985) and Riley's (Shank, 1989) cost drivers we believe to be important when trying to understand cost drivers for microfinance.

Cost drivers analysis allows the firm to understand the cause and effect relationship for the cost behaviour. Porter (1985) believed that cost drivers could more or less be under a firm's control, and it was thereby important to take conscious strategic choices related to the cost drivers for the firm.

#### **Economies or diseconomies of scale**

Porter and Riley both mentioned economies/diseconomies of scale in their cost drivers. Size is a structural factor that can have impact on costs. With large production volumes economies of scale can arise when activities are performed more efficiently and the cost are under-proportioned to the volume. Size may also involve diseconomies of scale with complexity and increasing coordination costs, when an increasing number of departments and employees have to communicate and interact.

In general, one would believe if an MFI could allocate the fixed operational expenses from lending activities per a million borrowers, that this would lower the cost per loan. Smaller loans have higher administrative costs than larger loans, but are expected to decrease due to economies of scale, as microfinance institutions grow larger. Moreover, they would then be able to lower the interest yield more than an MFI with only a few thousand clients (Rosenberg et al., 2009). The regression analysis from Rosenberg et al. (2009) indicated that MFIs capture most of the benefits from economies of scale by the time they reached around 2,000 clients, meaning that after an early point in their development they gained relatively little from economies of scale. The results from Hartarska, Shen, and Mersland (2013) also indicated that microfinance gained little from economies of scale. They found that serving more clients was more expensive than serving larger clients. This is probably due to the fact that microfinance institutions have lower fixed costs and

higher variable costs. Operational expenses are very large in microfinance institutions, where the majority of the costs come from labour costs. In short, the benefits of economies of scale do not compensate for the added expense that comes from making very small micro-credit loans.

### **Learning and experience**

Porter (1985) mentioned learning as a cost driver, while Riley referenced by Shank (1989) mentioned experience. Porter (1985) said that there were numerous ways that learning could lower cost over time. Some examples may be more efficient activities, labour efficiency improvement and procedures that increase the utilization of assets. The impact experience has on costs can be influenced by the number of times a firm repeats its' processes and learn from this each time.

Rosenberg et al. (2009) often referred to the learning curve, which is that an MFIs could achieve greater outcome when operations were performed several times. Microfinance institutions learn by doing. "As institutions mature, they learn their business better and are able to control costs more effectively" (Rosenberg et al., 2009, p. 14). MFIs operational expenses have dropped in recent years and this represents operating improvements, not just an increase in loan sizes. The regression performed by Rosenberg et al. (2009) suggested that much of these improvements reflected the learning curve as MFIs gained experience.

Caudill et al. (2009) also stated that learning by doing is particularly important for MFIs because it is about fundamental innovation in lending practices and the development of new lending methods largely through trial and error. The risk exposure in microfinance can also be best handled through experience, as managers and loan officers learn about their borrowers and the lending technologies most effective to serve them.

### **Technology**

Technology is used in the various stages of the firm's value chain and could affect costs. Choosing to be a leader or a follower in the industry regards to technological solutions can therefore be a strategic decision of importance.

The new banking technology such as ATMs, the use of cell phones and the Internet has begun to enter the microfinance industry. This has helped microfinance institutions to improve their sustainability and efficiency. These developments have helped to reduce costs and improve the delivery of service (Kapoor, Morduch, & Ravi, 2007; Rhyne & Otero, 2006), referenced by (Hermes, Lensink, & Meesters, 2011)

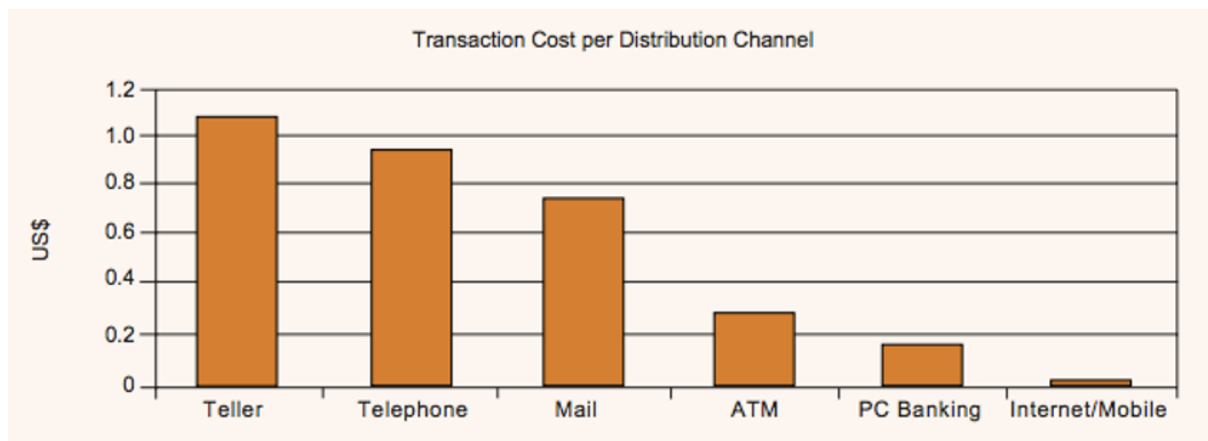


Figure 3: Transaction costs for U.S. Banks from Ivatury, Pickens, and Siedek (2006).

Microfinance institutions such as Banco Ademi in the Dominican Republic and ProCredit bank in Kosovo typically place ATMs in or near branches. The customers can perform routine deposit, withdrawal, and balance inquiry transactions at a far lower cost for the banks than the cost of having a teller. A result of this is freeing staff to sell products or give customers personalized attentions. ATMs also save costumers from having to wait in line to get to a teller (Ivatury et al., 2006).

A general trend is that banks worldwide are trying to move customers towards low-cost technological delivery channels. ICICI Bank in India reduced the numbers of transactions at branches from 78% of all transactions to 35%. The remaining 65% were processed online, at ATMs or over the phone (Ivatury et al., 2006).

### 3.4 Interest Rate

Microfinance institutions nominal interest yield was on average about 27% in 2011, where it has declined since 2004 when the interest yield was 30%. The interest yield declined in the period 2004 – 2007, but not in the period 2007 – 2011 (Rosenberg et al., 2013). Rosenberg et al. (2013) broke the interest yield for microfinance into four main determinants, which are: operational expense, financial expense, loan losses and profit.

Operational expense includes the cost of implementing the loan activities, personnel compensation, suppliers, travel, and depreciation of fixed assets. This component is the largest determinant of the interest yield. There has been a decline in average operating expense, but the decline has slowed recently. Rosenberg et al. (2013) said that it remained to see if this level of operating expenses would follow further declines, or whether this represented the bottom line of the learning curve effect.

Financial expense mainly refers to the cost of funding. Micro-lenders fund their loans with a combination of equity and debt. Cost of funding has increased substantially over the years. Micro-lenders have funded more of their portfolio from commercial borrowing. Funding costs have increased the most for micro-lenders serving the low-end clientele.

Loans from micro-banks are generally with very little or without any collateral and with no financial history from the client. Therefore, there is a high risk for micro-lenders due to late payments or defaults. On global bases, the loans losses have been fairly steady, but India and Mexico are two large markets, which have seen a large rises in bad loans in recent years.

Profits are the difference between income and expense. Profits have dropped from about one-fifth in 2004 to less than one-tenth in 2011.

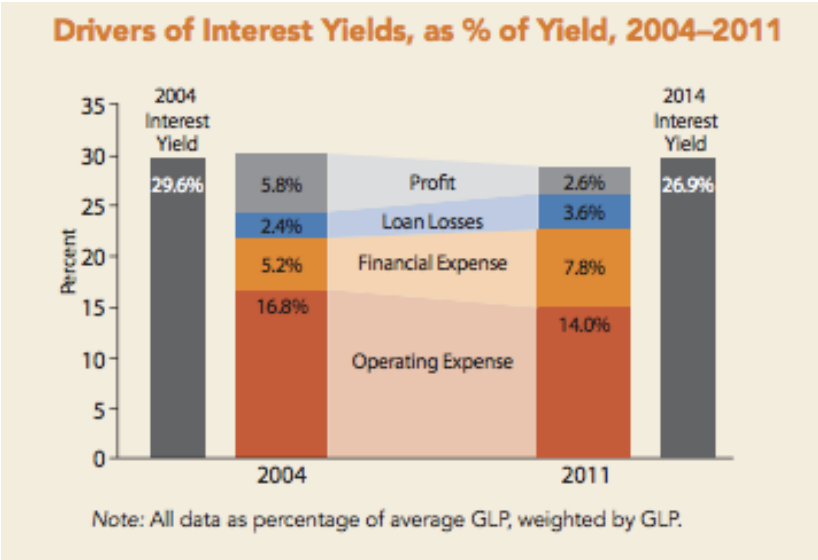


Figure 4: Drivers for interest yield from Rosenberg et al. (2013).

### 3.5 Competition

Earlier research on competition in microfinance is relevant for this thesis, since in general, economists agree upon the fact that competition typically results in reduced costs and lower prices for consumers. Moreover, it may also encourage the development of new products and efficient technologies (Assefa, Hermes, & Meesters, 2013).

Competition in the microfinance industry has increased rapidly in several countries (Assefa et al., 2013). One source of this increased competition can be the high growth rates in the recent years. In the period 2000 – 2005, average annual growth rates in terms of number of clients served by MFIs amounted to 50%, while during 2006 – 2008 70 – 100% per year in some markets (Sinha, 2010). Other sources of growth in competition are that commercial banks have become interested in entering the microfinance industry.

“In 1998, CGAP described commercial banks as “new actors in the microfinance world.” And seven years later commercial banks are playing an increasingly more important role in many financial services markets across the world “ (Isern & Porteous, 2005, p. 1). Commercial banks have started to become interested in entering the microfinance industry, since in the past MFIs have shown that this can be a profitable business (Hermes, Lensink, & Meesters, 2009). It also allows the commercial banks to show their corporate social responsibility. When a commercial bank has become involved in microfinance, it is then referred to as downscaling.

Rhyne and Otero (2006) illustrated the positive effects with an example from Bolivia. Microfinance in Bolivia is under competition, whereas the interest rates on microfinance loans have changed from 29% in 1998 to 21% in 2004.

Armendáriz and Morduch (2010) stated problems emerged due competition, especially in the two countries where microfinance was first established, Bangladesh and Bolivia. McIntosh and Wydick (2005) also reported problems with competition in Uganda, Kenya, Guatemala, El Salvador and Nicaragua. The problem with competition in Bolivia and other places was that borrowers were taking multiple loans simultaneously from different lenders (Armendáriz & Morduch, 2010). This resulted in borrowers becoming over-indebted, paying one loan by taking new loans from other lenders, which created a spiral of debt. In Bangladesh the problem has been called “overlapping” and Armendáriz and Morduch (2010) reported that there were more than one micro-lender operating in 95% of 80 villages surveyed by researchers at the Bangladesh Institute of Development. They had estimates that 15% of all borrowers took loans from more than one institution.

Grameen bank’s repayments rate went from above 98% to below 90% and dropping repayment rates have happened several places (Hermes et al., 2009; McIntosh, Janvry, & Sadoulet, 2005; Vogelgesang, 2003). “The lesson from these experiences is not that monopolies should be protected. In both Bangladesh and Bolivia, competition has brought a healthy round of general rethinking that would have not otherwise happened so soon” (Armendáriz & Morduch, 2010, p. 128).

### *3.6 Efficiency*

Previous research on the efficiency of microfinance is relevant to this thesis, since it is related to competition and costs, where Norwegian savings banks are amongst the most efficient. There has been an increased focus on financial sustainability and efficiency in microfinance due to a number of developments. Such as increased competition, commercialization of microfinance,

technological changes, financial liberalization and policies of the government (Hermes et al., 2011).

Hermes et al. (2009) conducted research on whether efficiency is related to the level of financial development in a country. They found strong supportive evidence for the hypothesis that there is a positive relationship between MFI efficiency and domestic financial development. Thus, more developed financial systems create more efficient MFIs.

The research from Assefa et al. (2013) on “Competition and performance of microfinance institutions” found that declining efficiency and weakened financial performance is shown to be associated with intense competition

### *3.7 Innovation*

Innovation might be perceived to be a new phenomenon, since the study of innovation did not emerge into a separate field of study before the 1960s. We can see through history that innovation has spanned through our lifetime. From the invention and application of fire, the wheel and the alphabet to the commercializing of the car, innovation has existed for a long time. It is in our humanity to think of better and new ways to do things and try them out (Fagerberg, 2004).

Schumpeter’s work has greatly influenced the innovation theory and his argument is that innovation drive the economic development by replacing old technologies with new, which he called “creative destruction” (OECD & Eurostat., 2005).

Microfinance in itself is an innovation as it created new markets and targeted customer that other banks had not bothered reaching. Jonathan Morduch stated that “the promise of microfinance was founded on innovation: new management structure, new contracts, and new attitude” (Morduch, 1999, p. 1572). A microfinance institution sets out to bank the unbankable and this contributes to the creation of new markets and customer.

#### *3.7.1 The Targeting of Poor People*

If we look to the lending to poor people, this is one of the micro-bank’s missions. However, when we look at this from a business perspective it becomes a way to discover and gain new markets (Mersland & Strøm, 2012b). The practice of lending money and offering savings possibilities are not a new invention in itself, banks have been issuing loans for a long time. An innovation can be a new way of applying an invention and microfinance takes the already established banking system and utilize the processes in a new market with new customers, and therefore it is an innovation rather than an invention (Schumpeter, 1934).

Before micro-banks were established, local moneylenders served the poorest clients. These lenders knew the local customers and therefore gave loans to those they knew were able to repay, in other words selecting the low-risk borrowers. The local moneylenders did, however, not have the knowledge needed to risk assess the lenders outside their area and did not have the possibility to use sanctions against borrowers not repaying their loans. Moreover, this precluded the lenders from obtaining economies of scale (Mersland & Strøm, 2012b). The asymmetric information that arises in a scenario like this is a prime example on how the information asymmetry prevents the establishment of new markets (Akerlof, 1970). What the micro-banks did was that they filled this gap to create a market where the poor could get loans and banking services.

### *3.7.2 Targeting Women*

Before micro-banking there was little interest in the banking of women (Lemire, 2002), one exception being eighteenth-century Irish funds consisted of one-quarter female clients. This was possibly due to the small loan amounts (Hollis, 1999). Mayoux (1999) stated that there were three main factors that favour the lending to women.

Firstly, lending to women will affect the efficiency of the micro-bank. There are many studies that document that women have a better repayment rate than men (D'Espallier, Guérin, & Mersland, 2013). This indicates that with a higher percentage of female borrowers the repayment rates will be higher.

Secondly, lending to women has a poverty reduction effect, since women invest their income to improve the well-being of their families.

Lastly, by giving loans to women they are able to enhance the income they contribute to the household and this can give them better bargaining power in the household (Mersland & Strøm, 2012b).

### *3.7.3 New Lending Technologies*

#### **Group Lending**

One key innovation that helped the Grameen bank expand internationally was group lending. By being able to lend to groups in villages they started to expand village by village, which contributed to their explosive growth. Due to the target customer for microfinance institutions usually do not have enough assets to use as collateral, the industry had to find alternative ways to ensure their payments.

When The Grameen Bank first started to lend money to the villagers in Jobra in Bangladesh, they did this, using individual loans. Later, it was the motivation of obtaining economies of scale that

led them to starting utilizing group loans. The process in which Grameen Bank lent money were for a group of five only two would get a loan. If these two repaid all the instalments in time another loan to two other group members would be issued. Lastly, if these two repaid their loan the last member would be granted a loan by the bank. This is referred to as sequential financing (Armendáriz & Morduch, 2010). If all loans were repaid the group would usually be offered a larger loan in the next loan cycle, also referred to as contingent renewal. Armendáriz and Morduch (2010) further explained how lending to groups helped with the adverse selection problem. The banks have little or no information about the creditworthiness of the borrowers and the risk of defaults is therefore high. This can lead to a decline in loans to safe borrowers as well. If banks have little knowledge about the borrower, the group can be a great way to select members that present a low risk when it comes to not being able to pay their instalments. Ghatak (2000) made a compelling argument that when it came to joint liability, people would choose group members that are similar to oneself whether they are risky or safe borrowers. It all came down to one owns success. If we, for instance, look at the scenario where one's project will succeed, there will be no extra benefit from having a safe or a risky partner. If we do not know the outcome of the project a safe borrower will increase the possibility of success by grouping up with other safe borrowers. Armendáriz and Morduch (2010) said the same as Ghatak (2000) which was that risky would pair with risky and safe with safe. The risky borrower cannot afford to compensate the safe borrower enough for them to agree on a partnership. This means that the loss a safe borrower will have from pairing with a risky borrower is larger than the risky borrower will profit from pairing with a safe borrower.

### *3.8 Developments in Norwegian Banks*

Norwegian banking customers have access to one of the world's most efficient systems for payment services. Norway has a more coordinated payment system than nearly any other country (Forsbak & Sparebankforeningen, 2004).

Since the start of 1960 and until today, the savings banks have led the development of today's electronic payment system. Until the mid-70s cash and personal checks were the predominant payment method. The savings banks started to deploy their first ATMs in the autumn of 1977 and by 1981 – 82 the savings banks had 200 ATMs in operation and 200,000 active savings customers, while the commercial banks had only just started their instalments of their ATMs. The public adapted quickly to these new payment services. By 1986, the number of savings banks' ATMs had rose to 550, which were two thirds of all ATMs in Norway at that point. To illustrate the quick adaption by the public, by 1985 there was one withdraw from ATMs for every fifth



check, and two years later this ratio was one withdraw from ATMs for every second check (Forsbak & Sparebankforeningen, 2004).

Norges Bank<sup>2</sup> is obligated by law to promote an efficient payment system in Norway and from Norway to other countries. Norwegian payment systems had their best progress in the decade of the 1990s in terms of technological solutions, cooperation between participants and services to the public (Haare & Solheim, 2012). In 1991 there were five different kinds of Eftpos<sup>3</sup> systems with different technologies, which created high fixed costs and counteracted development. At the end of 1991 a joint Eftpos company were created, BankAxept, which is a card solution system for payments. This new system was in full operation in 1995 after finally all payment terminals were deployed (Haare & Solheim, 2012).

From 1990s there was a large increase in the usage of electronic payments. To illustrate the changes, there were in 1984 issued 100 million personal checks, while only 1.5 million in 2003. Further, the value of electronic payments in 1994 was 100 million while in 2003, 550 million. The public changed their payment method and the circulation of cash started to decrease after 1999. Therefore, Norway have also decrease the number of ATMs (Forsbak & Sparebankforeningen, 2004).

Norges Bank launched a project to develop a more robust and efficient clearing and settlement system and by November 1999, Norges Bank has had a fully functional real-time settlement system. One feature was the development of a new system for online coverage control of the banks' accounts in Norges Bank (Haare & Solheim, 2012).

Internet banking was launched in 1996, but it was only after 2000 that people really began to use the solution. In 1998, the number of electronic giro transactions was approximately the same as paper-based giro transactions. Growth in the electronic solutions and the use of Internet as a channel for payment resulted in paper-based payments only utilized 5% all giro payments in 2010. The transition to electronic payment services has resulted in significant increase in banks' productivity in the payment area (Haare & Solheim, 2012).

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<sup>2</sup> Norges Bank is an executive and advisory, state owned, body for monetary, credit and foreign exchange policy.

<sup>3</sup> Electronic funds transfer at point of sale

## 4 Hypotheses Development

The theory and literature review on what impact age has on microfinance are mainly stating that age does affect operational expenses. To get a better understanding of the role of age, we include theory and literature review on market development phases and cost drivers. Mersland and Strøm (2012b) suggested that microfinance is in its take-off phase. This phase involves a high growth in the market, with competition focusing on improvement in the product and enhancing service levels. Rosenberg et al. (2009) found that the age of microfinance is strongly associated with lower costs. This is in line with standard economic theory that gives us the expectation that, in young industries, costs will improve as the industry grows and acquires more experience. Furthermore, Rosenberg et al. (2009) suggested that the recent drop in operational expenses reflects the learning curve. Caudill et al. (2009) stated that the general expectations that a firm should improve with time, *ceteris paribus*, are both an understatement and an oversimplification for MFIs. Furthermore, they described reasons for why costs should decrease or increase over time, as see section 3.1. While, both Rosenberg et al. (2009) and Hartarska et al. (2013) found that there exists little benefits for economies of scale in the microfinance industry. Moreover, Hermes et al. (2011) stated that the new banking technology, such as ATMs, the use of cell phones and the Internet has begun entering the market, and that this has helped reduce costs and improve the delivery of service. These theories and literature review are the basis of our first hypothesis:

*H1 Microfinance institutions achieve greater cost-efficiency over time*

*H2 Age of an MFI has an effect on operational expenses*

Furthermore, we outline theory and literature review on competition, efficiency and the interest rate. We look at these together with the market development phases and predict that Norwegian savings banks' development phase differs from MFIs'. Competition in microfinance has not the same effect that it has in Norway, which we believe to be a reason of the MFIs' current phase. Additionally, there are differences between the country's financial developments. Hermes et al. (2009) found strong evidence that efficiency is related to the level of the country's financial development. Our next hypothesis is therefore:

*H3 Norwegian savings banks' financial performance differs from microfinance institutions'*

Lastly, we outline what innovations that has been done in the microfinance industry and what development that has happened in Norway. The technology, alliances and the domestic cooperation in the Norwegian banking industry leading us to our last hypothesis:

*H4 Microfinance can learn from Norwegian savings banks*

## 5 Data

### 5.1 *Microfinance Institutions*

The microfinance dataset for this thesis is based on the observation of 473 rated MFIs in 77 different countries. For a list of all countries in the MFI dataset see appendix A1. The establishment of the standardized ratings have been conducted by third-party organizations and parts of the costs has been subsidized by outside organizations. To get MFIs to submit data they receive more access to external funding if they submit to the rating. Data that are collected from e.g. the Mixmarket database are so called self-collected data. The standardized MFI data from the third-party rating agencies are considered to be better than these and also includes both outreach and financial data (Mersland & Strøm, 2009). This makes the “Mersland dataset” ideal for measuring cost efficiency, sustainability and profitability. The agencies normally collect four years of data at every rating, but some MFIs report five, six or even more years of data at each rating. Due to the method in which the data are collected the dataset is a panel dataset and since not all banks report all years the dataset is an unbalanced dataset. We have data from 1998 to 2012 with more than 100 observations per year from 2001 to 2009. Due the small number of observations, year 1998 and 2012 are both eliminated. The decision was made on the basis that there were fewer than 20 observations for these two years.

To alleviate problems associated with country-specifics that arise when comparing companies from different countries, several measures have been taken to counter these. Firstly, all monetary values have been converted in to USD, since the exchange rate reflects the countries inflation rate. We also use a country specific variable, GDP per Capita, in the regression (Mersland & Strøm, 2010b). In section 5.3 we explain why GDP per Capita was elected. We also use a fixed effects model since it removes time invariant and idiosyncratic differences from the data (Wooldridge, 2010). The bases for this decision will be explained when the results for the regressions are presented in section 7.2

### 5.2 *Norwegian Savings Banks*

The dataset for Norwegian savings banks used in this thesis are all public data collected from Finance Norway online (fno.no/en). The data are from 1995 to 2014 and include (i) Profit and loss accounts in NOK thousand for the parent bank, (ii) Balance sheets in NOK thousand for the parent bank, (iii) Profit and loss accounts in per cent of average total assets for the parent bank, (iv) Balance sheets in per cent of total assets for the parent bank, (v) Key figures for the parent bank, (vi) Risk per PCC/Share, (vii) Key figures on Equity Certificates. We will utilize i-iv for our calculations and analysis.

Not all banks are represented in all years and we have therefore eliminated these from the dataset. During the period of our dataset we have several banks that merge. To make our sample as equal as possible we eliminate all merging banks and keep those who are represented the entire time period. This includes the banks that change names, but did not merge with any other banks. E.g. Nøtterø sparebank changed name to Sparebank 1 Nøtterøy-Tønsberg in 2010 and had no overlapping accounting numbers and hence will not be eliminated from our dataset. We have several banks that changed names during the period so these banks will not be eliminated from our dataset, as they are in the same category as Nøtterø sparebank. The largest banks are also omitted from the dataset. These are banks that report financial revenues and total assets at a substantially higher level than the other banks throughout the entire period. After these eliminations we are left with 81 banks that are represented in all years, which gives us a total of 1,620 observations with 81 observations each year.

To make the figures comparable to the figures in the MFI dataset we convert the numbers for Norwegian savings banks from NOK to USD.

### *5.3 Regression Analysis*

As a part of this paper we want to find out whether the age of an MFI has an effect on operational expenses and portfolio yield. We therefore intend to run two regression analyses with operational expenses and portfolio yield as the dependent variable and age as the independent variables using several control variables. For operational expenses, we use the absolute value for the MFIs as the dependent variable. The same goes for the portfolio yield. Then we utilized total assets as a measure of size together with average loan, personnel productivity, GDP per capita and two dummy variables for loan methodology as the control variables.

We decided to use operational expenses in percent of total assets as the dependent variable and exclude total assets from this regression. The new dependent variable was more suited to pick up the size of the banks and also better captured the growth of the MFIs. Total assets will still be included in the regression for portfolio yield.

As mentioned earlier in this section we want to test whether the age of an MFI affects the operational expenses and portfolio yield. Age is then our independent variable and we want to see how the cause-and-effect relationship is between the dependent variable and independent variable. For age we used the year in which an MFI began with microfinance activities. We then subtracted this from the year in which a particular observation was reported giving us the age of the MFI for that particular year.

Average loan has an effect on operational expenses. The lower the loan the higher the cost per loan will be. When issuing a loan there will always be fixed costs that will, for smaller loans, be distributed over a lower loan amount increasing the total cost for that particular loan (Mersland & Strøm, 2010b). This is the reason we included this as one of the control variables. We will therefore expect this variable to be significant and have a negative, decreasing, effect on the operating expenses.

The productivity of the employees is defined by how many credit customers they are responsible for. When having a cost saving perspective the more customers per employee the better. The cost of one employee will be lower per customer if that employee can handle more customers. This is why we utilize this as one of our control variables. We are then to believe that this variable will have a negative, decreasing, effect on the operational expenses, since the higher the customer count per employee the more cost efficient the bank becomes.

Moreover, we need to include a country specific variable since the country in which a bank is operating has an effect on the performance (Mersland & Strøm, 2010b). GDP being a measure of economic size for a country and on the bases of the research of Hartarska (2005) we elected to use GDP per capita as a country specific variable. As this is a measure of economic size for a country, we presume this variable to reduce the operational expenses.

To control for the size of the MFIs we include a size variable that is the natural logarithm of total assets. This is a way of transforming a skewed variable in to a more normally distributed variable (Benoit, 2011). If you look to appendix A2, this particular variable is presented through two histograms, one to illustrate the skewness of the total assets and then how the utilization of the natural logarithm transforms the variable to be almost normally distributed. We believe this variable will have a negative effect on the operational expenses.

Lastly, we need to control for the loan methodology. Armendáriz and Morduch (2010) stated that the loan method has an effect on the costs and is therefore included in the regression as two dummy variables. The MFIs in our dataset have four methods of lending, village loans, solidarity groups, individual loans and others. Therefore, we create dummies for village loans, solidarity groups and individual loans and due to the few observations with other loan methods we eliminate the MFIs that are classified as utilizing this methodology. We then sat up a dummy for each of the remaining methodologies. For the village loan dummy we gave the MFIs issuing village loans the value 1 and 0 for the MFIs utilizing a different methodology. We then did this for the other two loan methods. Furthermore, we ran a correlation analysis to see the correlation between these dummies and eliminated the one with the highest correlation, being individual loans, ending up with a dummy for village loan and solidarity group loans. This means that our base group is

individual loans since this dummy is omitted from the regression. When analysing the results of the regression, our dummies will measure the proportionate difference in relation to issuing individual loans (Wooldridge, 2013). Mersland and Strøm (2010a) demonstrated in their paper that the cost of maintaining group loans exceeded the benefits of these loan methods. Armendáriz and Morduch (2010) stated that group loans were a way of achieving efficient outcomes. This leads us to believe that our predictions for these variables are ambiguous and we are not able to predict the effect of these dummies. Therefore, it will be interesting seeing which of these theories our regression will support.

Variable	Definition	Obs	Mean	Median	Std. Dev.	Min	Max	Hyp.
Operational Expenses	Operating expenses divided by the average total assets	1,883	0.2124982	0.1704908	0.1544158	0.0013426	1.7123	
Portfolio Yield	The portfolio yield at the end of the year in \$million	2,169	0.3790763	0.341	0.1873622	0.007	1.825	
Age	Years of experience as a MFI	2,197	11.38598	10	7.330436	1	80	-
Size	The natural logarithm of total assets	2,255	15.14508	15.14759	1.498816	9.867238	19.44798	-
Average Loan	Average loan size in \$million	1,311	1747.072	731	17394.65	15	623874	-
Personnel Productivity	Number of credit clients per employee	2,082	132.9165	111	110.0143	1	1893	-
GDP per Capita	GDPPC in the end of the period in \$million	2,162	2304.995	1547.267	2256.599	111.5312	13392.92	-
Village Loan	1 if the MFI issues village loans	2,071	0.1921777	0	0.3941071	0	1	+/-
Solidarity Group	1 if the MFI issues solidarity group loans	2,071	0.2554322	0	0.4362092	0	1	+/-

Table 2: Overview of the regression variables with descriptive analysis.

## 5.4 Accounting Ratios and Financial Ratios

Norwegian savings banks and microfinance institutions are on opposite sides of the scale. It will therefore be interesting to investigate differences in the financial statements. We have based our descriptive analysis on Mersland and Strøm (2014) article on “measuring microfinance” and taken the same accounting figures and ratios. They use main accounting figures for the average MFI and with those accounting figures they measure the most commonly used ratios. The ratios used are ROA, Profit Margin, and OSS, which measure sustainability and profitability. Additionally, we added cost income ratio, operational expenses and net financial revenue. After looking at the financial statement for Norwegian savings banks, it seems that these ratios are highly used and measures efficiency in banks. These accounting ratios are used in order to show how banks are performing in relation to each other.

### 5.4.1 Return on Assets (ROA)

The most common measure of profitability is the return on assets for banks and other commercial institutions (Rosenberg et al., 2009). Defined as:

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Total assets}}$$

Net income is calculated by taking all revenues and deducts all expenses of doing business, interest, taxes and other expenses. Total assets are calculated as the average total assets, which imply that the total assets at the beginning of the year and the end of the year are added together

and divided by two. However, the microfinance dataset do not have any records for taxes before 2003, but the ROA is already calculated and given to us from the dataset. To see whether the calculation methodology selected applies to these given ROAs, calculations for the years where the necessary numbers are available were conducted. The similarity of the given ROA and the calculations give reason to perceive them as reliable and are therefore used in the analysis for MFIs. For the Norwegian savings banks, the calculation methodology presented will be used.

The return on assets shows how the MFI is performing relative to its assets (Ledgerwood, 2014). A high return indicates high returns for the lending activities.

Mersland and Strøm (2014) pointed out that a return should cover the risk-free rate together with a markup covering the systematic risk of the MFI. Since few of the MFIs are listed, such a risk-adjusted return is hard to calculate. However, calculations of this nature will be beyond the purpose of this thesis.

#### *5.4.2 Net Operational Income in Percent of Revenues (Operational Profit Margin)*

Net operational income in percent of revenues is defined as net operational income divided by financial revenue. The ratios profit margin and assets utilization is the decomposed return on assets. Usually, it is normal to use the profit margin defined as Net income divided by total revenues. The profit margin looks at the profits relative to total revenues (Ledgerwood, 1998). However, due to the microfinance dataset not having any records for taxes before 2003, the net operational income was elected instead of the net income in order to keep the observations from 1999 to 2003.

$$\text{Operational profit margin} = \frac{\text{Net Operational Income}}{\text{Financial revenue}}$$

The net operating income is all expenses before the extraordinary income and expenses, donations and taxes subtracted from the revenues. For both MFIs and Norwegian savings banks the Net operational income will be used.

#### *5.4.3 Operating Self-Sufficiency (OSS)*

Armendáriz and Morduch (2010) reported the operating self-sufficiency (OSS) measure. This ratio measures the extent to which the operational revenues of a microfinance institution cover its operating expenses. Defined as:

$$\text{OSS} = \frac{\text{Operational Revenues}}{\text{Expenses on (funding + loan loss provision + operation)}}$$

Operational revenue is all revenue generated by the operations conducted by the banks. It consists of interest and fees by borrowers, financial revenue, but also investments and other services as insurance and sales, other operational revenue. Financial expense is the cost of raising capital, interest and fees the institution pays to commercial banks, shareholders, investors and depositors. Loan-loss provision expense is the amount that is set aside to cover loans from defaults. The last item is the operational expenses, which cover rent, staff wages, transport costs and more. Same as for ROA, the MFI dataset provide the OSS without any calculations and just defined as the OSS. To test the reliability of the OSS given in the dataset, the same calculation test as conducted for ROA, is performed for the OSS. As the deviation between the calculated OSS and the given OSS is not at a noteworthy level we consider the given OSS to be reliable. The same formula will be utilized for the Norwegian savings banks.

CGAP consensus guidelines (CGAP, 2003) recommend that additional to operational expense both financial expense and loan-loss provision expense should be included, since they are normal (and significant) cost of operations. While some argue that OSS should not include financing expense, since not all MFI incur financing costs equally (Ledgerwood, 1998). MFIs may fund all their loans with grants or concessional loans and do not need to borrow funds or collect savings and thus either do not incur any financing costs or incur minimal costs (Ledgerwood, 1998). We chose to have both financial expense and loan-loss provision in our OSS measure and this may be a weakness, as all MFIs may not be financed equally.

The OSS ratio is often expressed as a percent. A value of 100% indicates full operational self-sufficiency, while a value below 100% indicates that the institution must rely on continued outside funding to maintain its current level of operations (Armendáriz & Morduch, 2010).

If the OSS is not achieved, eventually MFIs equity (loan funding capital) will be reduced due to losses. This will result in smaller amounts of funds to be used as loans given to borrowers, which may lead MFIs to go bankrupt as funds run out. To prevent this, they need to raise additional grants to cover the operational shortfalls. To increase the operating self-sufficiency one must either increase the yield (return on assets) or decrease the expenses (financial expenses, provisions for loan losses, or operating expense) (Ledgerwood, 1998).

#### *5.4.4 Cost-Income Ratio (CIR)*

A popular efficiency ratio in the banking industry is the Cost Income Ratio (CIR), which also is widely used as a yardstick when comparing banks' productivity and efficiency. CIR is a ratio that calculates costs with respect to revenue. The commonly held notion is that a high CIR is



equivalent to low productivity and low efficiency and vice versa (Burger & Moormann, 2008).  
Defined as:

$$\text{Cost Income Ratio} = \frac{\text{Operational Expenses}}{\text{Operational Income}}$$

Operational expenses are the cost of doing business and do not include the financial expenses as these are a part of the denominator. They are directly extracted from both datasets and used in the calculations. Operational income, compared to operational revenue, is calculated as net financial revenue together with other operational revenue whereas operational revenue is financial revenue and other financial revenue.

“Banks situated in a country with comparatively high interest margins *ceteris paribus* appear to be more productive than others” (Burger & Moormann, 2008, p. 87). Microfinance institutions have a higher risk exposure than Norwegian savings banks, which may suggest that they might appear more efficient than Norwegian savings banks. Nonetheless, considering that microfinance has significantly higher operational expenses gives reasons to believe they are not more efficient than Norwegian savings banks.

Microfinance institutions and Norwegian savings banks can use this measure to analyse how costs changes compared to the income, which is very important when operating in a market where cost control is essential.

Burger and Moormann (2008) pointed out that CIR has limited prediction power and suggested an adjusted CIR. They pointed out that factors such as interest rate, commission fees and factor costs had an impact on the CIR, and that those factors could vary between countries. Additionally, non-recurring items, how much risk a bank take, economic cycles and accounting principles may affect CIR. Burger and Moormann (2008) suggested adjusting CIR with respect to interest margins and for national difference in labour costs. Due the scope of this thesis, we do not have the sufficient time, knowledge or data to perform such an adjustment.

#### 5.4.5 Operational Expenses

Operational expenses are treated the same way as in section 5.4.4 and are extracted directly from both datasets.

$$\text{Operational expenses as \% of total assets} = \frac{\text{Operational exepense}}{\text{Total Assets}}$$

Total assets are given as average total assets for the Norwegian savings banks, whereas for the MFIs, they are as reported in the balance sheet at the end of a given period. For the MFIs, total

assets are converted in to averages by taking the total assets for the year before and the particular year divided by two. This means the first year of observations are shifted one year giving us a period from 1999 to 2012.

#### *5.4.6 Net Financial Revenues*

The financial revenues and expenses are directly extracted from the dataset for both MFIs and Norwegian savings banks. They are calculated in percent of total assets.

$$\text{Net financial revenues as \% of total assets} = \frac{\text{Financial Revenues} - \text{Financial Expenses}}{\text{Total Assets}}$$

The net financial revenue is an important source of earnings. Net financial revenues describe the difference between financial revenues from loan portfolio, loan investments and other operating revenues from interest paid on borrowings, deposits and other financial expenses. We will compare net financial revenues in relation to average total assets for both industries in the period 1995 through 2014. Net financial revenue explains the earnings MFIs and Norwegian savings banks get from lending activities. Net interest income is strengthened through increased financial revenues and reduces financial expenses.

## 6 Methodology

Methodology is a procedure for gathering empirical data, an instrument for giving a description of the so-called reality. Good knowledge about methodology is important to distinguish between results created by the chosen methodology and reality (Jacobsen, 2010).

The methodology is selected for this thesis is to answer its main research question and sub-research questions in the best possible way and to create a good structure. The research question is formulated as the following:

### **Can microfinance institutions become more efficient by learning from Norwegian savings banks?**

1. Are MFIs becoming more efficient over time?
2. How do MFIs compare against Norwegian savings banks?
3. What have Norwegian savings banks done to become so efficient and can these innovations be transferred to MFIs?

To answer sub-research question one, we are first going to construct a graph illustrating the development of the operational expenses of the MFIs to test if they become more efficient with time. Then, a t-test will be performed to see whether there is a significant change in the mean from the first year to the last. This test will answer our first hypothesis. Secondly, we are going to conduct a panel regression to test our second hypothesis, where age is the independent variable to estimate whether the age of an MFI has an effect on the operational expenses and portfolio yield. For sub-research question two we are comparing an excerpt of the financial statements and accounting ratios, which is based on Mersland and Strøm (2014) article on measuring microfinance. With these accounting ratios we will test the sustainability and efficiency measures to see how those evolve during the time period. Through this, we can illustrate the differences in a clear and straightforward manner and give an answer to our third hypothesis. We will utilize the ratios ROA, operational profit margin, OSS, CIR, net financial revenue and operational expenses in percent of total assets. There will also be conducted t-test to see if the differences in the means for the MFIs and Norwegian savings banks are significant. For sub-research question three we talked to key personnel in Eika group through email to get Eika's insights on the subject. Lastly, we will look at the Norwegian savings banks and the possibilities for transferring their focus on cost reduction and technological developments over to the microfinance industry, which answers our fourth hypothesis.

## *6.1 Research Design*

Research design is designing the research in such a way that the requisite data can be gathered and analysed to arrive at a solution for the problem. A research design includes collection, measurement, and analysis of data, based on the research question of the study (Sekaran & Bougie, 2013)

### *6.1.1 Methodological Approach*

When collecting data we usually distinguish between two methodological approaches, deductive and inductive. A deductive approach implies from theoretical to empirical. With this approach you start with forming expectations about how reality is based on earlier research and theories. Then gathering empirical data, to test whether expectations actually matching with reality. The criticism for this approach is that the researcher only looks for relevant information that he or she finds relevant to back up the anticipating outcome (Jacobsen, 2010).

The alternative is the inductive methodological approach, which is from empirical to theoretical. This approach begins with gathering relevant information from the reality, then systemises the information and creates a theory. Critics with this approach have been that it is impossible and naive to think people can have a totally open mind. Modern psychological research has found that people do not have the capacity to collect all relevant information (Jacobsen, 2010).

The purpose of this thesis has been to research and identify possibilities for microfinance institutions to be more efficient by learning from Norwegian savings banks. This is done through testing whether MFIs is becoming more efficient with time, in terms of operational expenses. Additionally, we will test whether age has an effect on operational expenses. Next we research if there exists differences between MFIs and Norwegian savings banks and finally if MFIs can learn from Norwegian savings banks. With basis in theory and earlier research we have built expectations, then we gathered empirical evidence to consider if the expectations are coherent with what we see in the reality. This is the reason for why our thesis uses a deductive methodological approach.

### *6.1.2 Purpose of the Study*

When distinguishing the purpose of the study, one can separate it in to three different purposes; exploratory, descriptive and causal. An exploratory study can be defined to explore, the objective of a descriptive study is to describe, and lastly, a causal study is to find the cause-effect relationship (Sekaran & Bougie, 2013).

Descriptive studies are used when collecting data that describe the characteristics of persons, events or situations. We answer our research question mainly based on the collected data from

473 MFIs from 77 different countries spanning 15 years and 81 Norwegian savings banks spanning 20 years, which makes our thesis descriptive. Sub-research question three, studies what Norwegian savings banks have done to become cost efficient, and if innovations done in Norway can be transferred to MFIs. The first part is based on earlier research, theories and talking to key informants from the banking industry in Norway and therefore this sub-research question has a descriptive purpose. However, the last part is about the future and there exists little or no earlier research about this, and therefore the sub-research question also has an exploratory purpose.

## *6.2 Data Materials*

In this chapter we will describe what methodological approaches that has been used when gathering, processing and analysing the data. We will define key aspects related to these processes and evaluate the quality of the datasets.

### *6.2.1 Primary and Secondary Data*

Whether the data collected are primary or secondary data all depends on how they are collected and for what purpose. Primary data is data collected by the researcher directly from the primary source in which the researcher is investigating. This is data that are of specific interest for the purpose of the study, and the collection is carried out first-hand. This makes the data specifically tailored to the research's purpose. On the other hand we have secondary data. This is data that are collected from another source where the data were collected for another purpose than the researcher are going to use it for. This is data collected from sources that already exist. Secondary data can be company records, websites, financial statements and government publications (Sekaran & Bougie, 2013).

The data used in this study are mostly secondary data obtained from Finance Norway and the Mersland dataset. The only primary data are collected directly from the Eika group through email.

The advantage of using secondary data is that it saves time and cost when it comes to the collection process. One drawback of using secondary data is that, over time, the data will be obsolete and it is therefore important to make sure that the data is up-to-date and the information are current (Sekaran & Bougie, 2013).

### *6.2.2 Qualitative and Quantitative Data*

The methodology literature separates between qualitative and quantitative methods. To distinguish between these, one separate mainly on how the data is gathered and analysed. Qualitative method has a focus on data that is text while quantitative method focuses on data that is numbers (Jacobsen, 2010). This thesis mainly uses quantitative data, but also have a part of qualitative data.

With a quantitative approach it is necessary to categorize and structure before gathering data. This requires clear variables and values that can be assigned numbers. The gathering of information requires a more closed approach. The advantages with quantitative data are that the information is easier to process and to generalize because of the large material. Additionally, a quantitative approach can be characterized, as describing a given circumstance relatively accurate and that you do not develop a personal connection to certain respondents. The disadvantage with this methodology is that it can give a superficial touch because of the focus to reach many units and thus being neither complex, nor deep enough (Jacobsen, 2010).

A qualitative approach has the advantage that it emphasizes details, nuance and the uniqueness of each respondent, which gives the approach its openness. With the qualitative approach one gathers data and then categorize and structure the information. Advantages with this approach are the flexibility and possibility to change the research question and that there is an unclear selection between gathering data and the analysis. Disadvantages with qualitative approach are that it is resources intensive and problems with generalization arise with small samples. Additionally, it can be problematic with complex data materials and that researchers unconsciously screening out information (Jacobsen, 2010).

The analysis of microfinance and Norwegian savings banks are rooted in the dataset and the annual financial statements, which makes this thesis quantitative. These accounting numbers are applied when analysing whether MFIs are becoming more efficient over time and when comparing both industries. Additionally, it can be discussed if a qualitative approach should be used for sub-research question three. We have sent emails to key personnel in the Norwegian banking industry to gather information about what made the Norwegian savings banks, so cost efficient, which is a qualitative approach. Further we also used earlier research on the innovative development in Norway. Using the two approaches are considered to be complementary, not competing (Jacobsen, 2010) and may therefore be an advantage.

### *6.2.3 Reliability*

Three reliability types that are used in quantitative research, identified by Kirk and Miller (1986) are:

1. To what degree a measurement that is repeated remains the same
2. The stability of a measurement over time
3. The similarity of the measurements given within a set time period.

From this, we interpret that the reliability tells us, to what extent, which results are consistent over time and if the results of a study can be reproduced under a similar methodology (Golafshani, 2003).

The data for the Norwegian savings banks are all collected from official and public annual accounts for savings banks published by Finance Norway. The dataset consists of all savings banks registered in Norway and are available from 1995 through 2014. Not all banks are represented all 20 years, so in order to increase the reliability we found 84 banks that report all years. We also removed the largest banks from the dataset and were left with 81 banks. They are all subjects to Norwegian law and all are reported similar to each other making these data reliable.

The Microfinance part of our study is based on the observations of 473 rated Microfinance institutions from 77 different countries. The data are collected by third-party organizations, which have standardized the ratings. The dataset includes both financial and outreach data, thus making it well suited when studying microfinance. The dataset is unbalanced since not all MFIs report regularly or some started their business after the collection for the data commenced. As there are MFIs from different countries there might be differences between them that the data do not portray. This contributes to lower the reliability compared to the dataset for the Norwegian savings banks.

Reliable data do not always mean that the data used are all valid.

#### *6.2.4 Validity*

Validity is a measure that determines how truthful the research results are and gives an indication of whether one's research truly measures that which it was intended to measure. In other words, does the research instrument allow you to hit "the bull's eye" of your research object? (Golafshani, 2003). Validity can be divided into internal and external where the first refers to the faith we have in the cause-and-effect relationship. The latter refers to what extent the results found can be generalized or transferred over to actual, real world, settings (Sekaran & Bougie, 2013).

### 6.3 Regression Method

Regression is used to study the relationship between a dependent variable and one or several independent variables. The purpose of the analysis is to estimate the coefficients ( $\beta t$ ), which represents to what degree the independent variables affect the dependent variable (Wooldridge, 2013). You can either use a simple regression model with one independent variable or a multiple regression analysis that includes several independent variables. A multiple regression equation can be written as

$$y = \beta_0 + \beta_1 x_1 + \dots + \beta_k x_k + u$$

#### 6.3.1 The Regression Equation for Panel Data

Data containing time series observations of each cross-sectional member in the dataset are referred to as panel data. Cross-sectional data refers to data that has several units that have been observed over the same time period. In difference to a pooled cross-sectional dataset a panel dataset has cross-sectional units that are followed over a given period of time. Even though panel data can be harder to obtain than cross-sectional data there are several advantages of having a panel dataset. By having several observations for one particular unit over time enables us to study unobserved characteristics of that unit. Panel data can also help studying lags in behaviour since some effects only acts after some time has passed (Wooldridge, 2013).

With panel data one usually obtain a higher degree of freedom and more variability in the sample than one would obtain with cross-sectional data or time series data. Observations in panel data involve at least two dimensions; the time series dimension, indicated by subscript  $t$ , and the cross-sectional dimension, indicated by subscript  $i$ . These two can be viewed as having either  $i = 1$  for the first and  $t = 1$  for the latter (Torres-Reyna, 2007).

The regression equation for panel data can be written as

$$y_{it} = \beta_0 + \beta x_{it} + \gamma d_t + u_{it}$$

$Y$  is our dependant variable and will in our case be represented by operational expenses in percent of total assets for our first regression and portfolio yield for the second regression. The notation  $i$  represent the banks and since we have 473 we will have  $i = 1, \dots, 473$ . The data are for a period of 13 years, from 1999 to 2011 making  $t = 1, \dots, 13$ .  $\beta_0$  represents our constant, also called intercept, and indicates where the equation will intercept the y-axis. Our explanatory variables are indicated by  $x$ . All variables have been explained in section 5.3. The  $x$  is followed by the notation  $it$  since the regression will measure each variable for every bank every year. The  $\beta$  represent the



coefficients for the explanatory variables and tells us how the equation is affected by a specific variable (Wooldridge, 2013).

The equation also includes time-period dummy variables  $d_t$ , which will take the value 1 or 0. We will have one dummy for each year giving the dummy for year 1, 1999, the value of 1 and all others 0.  $\gamma$  is the coefficient for the dummy variables and the  $\gamma$  for 1999 will then be  $\gamma * 1$  for  $t = 1$  and  $\gamma$  for the other dummies will be  $\gamma * 0$  for  $t = 1$ . This means that the intercept will be  $\beta_0 + \gamma_{1999}$  for  $t = 1$ ,  $\beta_0 + \gamma_{2000}$  for  $t = 2$  and so forth (Wooldridge, 2013).

All effects that are not captured by our explanatory variables are represented by the  $u_{it}$ . This is the error term, also called the idiosyncratic error or time-varying error. It is almost impossible to include all explanatory variables that affect the dependent variable, so the error picks up all the unexplained effects in the model that change over time and affects  $y_{it}$ . The error term consists of two components, one that changes over time,  $\mu_i$ , and one that is consistent,  $v_{it}$  (Wooldridge, 2013):

$$u_{it} = \mu_i + v_{it}$$

To measure the goodness of fit for the model we will utilize the R-squared. The standard R-squared measures how much the variation in the dependent variable is explained by the explanatory variables. The within R-squared will be used for fixed effects models since we can observe how much the time variation in the dependent variable are explained by the time variation in our explanatory variables. For the random effects models the overall R-squared will be used (Wooldridge, 2013).

### 6.3.2 Fixed Effects Estimation

The fixed effect captures all unobserved effects that are time-constant and are written as  $a_i$ . These are effects that are specific to each variable. By using fixed effects transformation we eliminate the  $a_i$ , this because we believe it to be correlated with one or more of the explanatory variables. We will then obtain so called time-demeaned data on  $y$ ,  $x$  and  $u$  and are left with the fixed effects estimator which allows, in any time-period, that  $a_i$  and the explanatory variables to be correlated. This again means that the  $\mu_i$  correlates with the  $x_{it}$ . This model, when utilized, will also omit all explanatory variables that are constant over time because the fixed effects transformation sweeps away all constant variables (Wooldridge, 2013).

Wooldridge (2013) presented the assumptions for fixed effects estimation as

1. For each  $i$ , the model is

$$y_{it} = \beta_1 x_{it1} + \dots + \beta_k x_{itk} + a_i + u_{it}, t = 1, \dots, T,$$

where the  $\beta_j$  are the parameters to estimate and  $a_i$  is the unobserved effect.

2. Each explanatory variable changes over time (for at least some  $i$ ), and no perfect linear relationships exist among the explanatory variables.
3. For each  $t$ , the expected value of the idiosyncratic error,  $u_{it}$ , given the explanatory variables,  $x_{it}$ , in all time periods and the unobserved effect,  $a_i$ , is zero

$$E(u_{it}|x_i, a_i) = 0$$

4.  $Var(u_{it}|x_i, a_i) = Var(u_{it}) = \sigma_u^2$ , for all  $t = 1, \dots, T$
5. No autocorrelation shall occur in  $u_{it}$

$$Cov(u_{it}, u_{is}|x_i, a_i) = 0$$

6. Conditional on  $x_i$  and  $a_i$ , the  $u_{it}$  are independent and identically distributed as  $Normal(0, \sigma_u^2)$

### 6.3.3 Random Effects Estimation

In section 6.3.2 we stated that if  $a_i$  was correlated with the explanatory variables our goal were to eliminate it. If  $a_i$  is uncorrelated with the explanatory variables a transformation to eliminate  $a_i$  leads to inefficient estimators. The assumptions under random effects estimation are more or less the same as the assumptions under fixed effects, except that it also include the requirement that  $a_i$  is independent from all  $x_{it}$ . This assumption will in most circumstances usually not hold. This can be circumvented by adding constant control variables, which will then draw from the error leading to a strengthened explanation power for the explanatory variables. This means that the correlation between the error and the explanatory variables will be reduced. In RE the time varying part of the error term,  $\mu_i$ , is also considered to be a part of the error term, not spilt in a time varying error and a constant error (Wooldridge, 2013).

Wooldridge (2013) presented the assumptions for random effects estimation as

1. For each  $i$ , the model is

$$y_{it} = \beta_1 x_{it1} + \dots + \beta_k x_{itk} + a_i + u_{it}, t = 1, \dots, T,$$

where the  $\beta_j$  are the parameters to estimate and  $a_i$  is the unobserved effect.

2. There are no perfect, linear relationship between any of the explanatory variables  $X$
3. Each explanatory variable changes over time (for at least some  $i$ ), and no perfect linear relationships exist among the explanatory variables.
4. For each  $t$ , the expected value of the idiosyncratic error,  $u_{it}$ , given the explanatory variables,  $x_{it}$ , in all time periods and the unobserved effect,  $a_i$ , is zero

$$E(u_{it}|x_i, a_i) = 0$$

5.  $Var(u_{it}|x_i, a_i) = Var(u_{it}) = \sigma_u^2$ , for all  $t = 1, \dots, T$

7. No autocorrelation shall occur in  $u_{it}$

$$Cov(u_{it}, u_{is}|x_i, a_i) = 0$$

6. Conditional on  $x_i$  and  $a_i$ , the  $u_{it}$  are independent and identically distributed as  $Normal(0, \sigma_u^2)$

#### 6.3.4 Hausman Test

To determine whether to use fixed effects estimation or random effects estimation it is common to use both methods, and later test the statistically significant differences in the coefficients on the time-varying explanatory variables. To test these differences, we will perform a ‘‘Hausman test’’. If the null hypothesis, that there are statistically significant differences in the coefficients is not rejected both FE and RE can be used since their estimates are sufficiently close, so it does not matter which method one uses. Rejecting the null hypothesis means that the assumptions for RE is not upheld and one must use FE (Wooldridge, 2013).

#### 6.4 T-test

When analysing the trends and comparing MFIs against Norwegian savings bank we have to test whether these developments and differences are significant. Through testing for significant

differences between the first year of observations and the last year, the t-test states whether the change for this period is significant. There will also be tested whether there are differences between the means for MFIs and Norwegian savings banks for the variables that are to be compared against each other. These tests will be performed for all variables used in section 7.1 and 7.3. The table in appendix A9 will state the t-values and the significance level either at a 10%, 5% or a 1% level. All hypotheses for the t-tests will be that the differences in the means are equal zero,  $H_0 = 0$ . If these hypotheses are rejected the alternative hypotheses states that there is a difference in the means,  $H_A \neq 0$  (Wooldridge, 2013).

# 7 Findings

## 7.1 The Development in Operational Expenses for MFIs

To answer our first hypothesis we utilize a ratio that illustrates whether or not microfinance achieves greater cost-efficiency over time, with respect to operational expenses. The ratio operational expenses in percent of average total assets are highly important in the microfinance industry, due to the effect it has on the portfolio yield. Microfinance is also a highly labour-intensive industry and the ratio illustrates the daily operations.

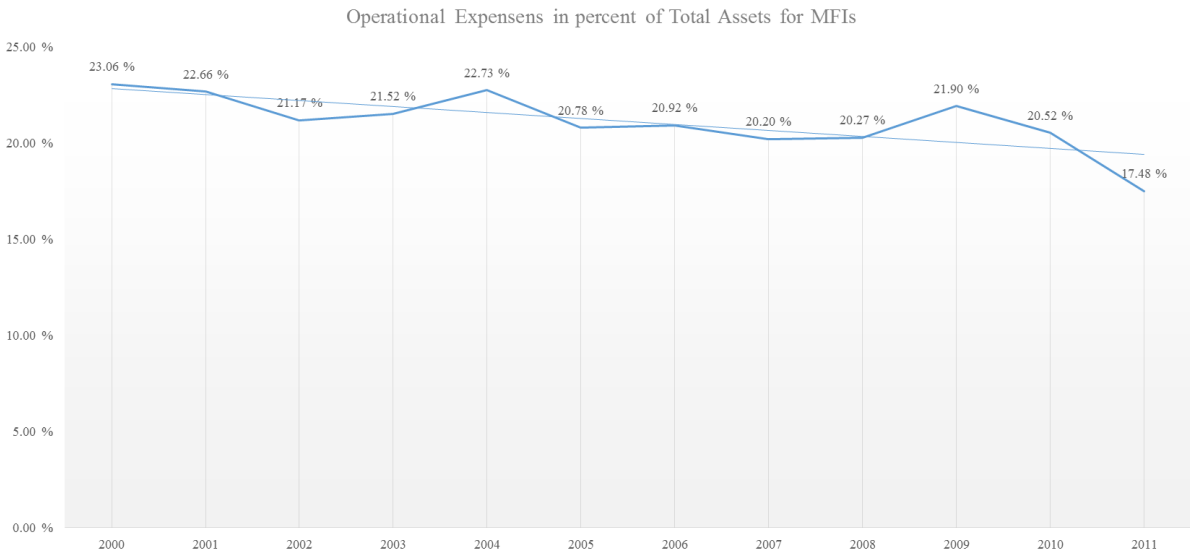


Figure 5: Operational expenses in percent of total assets for MFIs.

Figure 5 illustrates a decreasing operational expense whereas we notice increases in three periods, 2002 to 2004, 2005 to 2006 and 2007 to 2009. The overall effect is unmistakably illustrating a decrease in the selected period for the microfinance as a whole. Microfinance started with an operational expense ratio of 23.06% in 2000. In the period 2000 to 2011 the MFIs have reduced their cost with 24.19%, ending up with an expense ratio of 17.48%. Hug (2014) and Rosenberg et al. (2013) stated that operational expenses are the largest determinant of the interest yield and the results we find in our study can possibly verify the general decrease in the interest yield Rosenberg et al. (2013) found. Moreover, after performing a t-test with unequal variances we did find that there are significant differences in the means for 2000 and 2011, hence the data statistically support the hypothesis that MFIs are becoming more cost-efficient with time. The output for the t-test can be found in appendix A9.

## 7.2 Regression Analysis

In this chapter we will discuss our findings after running the panel regression analyses for operational expenses in percent of total assets and portfolio yield. The goal of the regression analyses is to test our hypothesis stating that age has an effect on the MFIs operating expenses.

The two regressions differ in the sense that the dependent variables are different from one another. Since the dependent variable in the first regression accounts for the size of the MFI due to being a proxy for the operational expenses in percent of total assets there is no control variable for the size of the firm. Therefore, for the latter regression, there will be a size variable as one of the control variables.

We are running a regression using a panel dataset and similar to Mersland and Strøm (2010b) utilized both a random and fixed effects model. If the regressions produce similar coefficients, and are significant, this will further increase our faith in the results. As seen in appendix A6 the regressions for random effects and fixed effects yield different results. This is due the fact that the fixed effects model performs the regression on the individual averages subtracted from the annual averages. Moreover, when running a fixed effects model the fixed effects transformation aims to eliminate the time varying error term. Whereas in a random effects model, this is considered as being a part of the error term and therefore not eliminated (Wooldridge, 2013). Due to the difference in results we need to establish whether we are to use the fixed effects or random effects estimation.

As described in section 6.3.4 we utilize the Hausman test as a tool to decide whether to use random or fixed effects estimation. The results of the test can be found in the appendix A3. After running the test we cannot reject the null hypothesis for regression (1) and (3). The Hausman test for regression (2) and (4) tells us that we have to reject the null hypothesis meaning we have to run fixed effects estimation. Therefore, we have selected to run fixed effects estimation on both regressions, as explained in section 6.3.4, since when rejected, both FE and RE can be used. This is so that both regressions will be under the same assumptions and conditions.

Furthermore, to not violate the assumptions for FE we cluster by banks since this makes the model robust against autocorrelation and heteroscedasticity.

The R-squared for these regressions are 0.2051 for the first and 0.0597 for the latter. Considering that we only have six and seven explanatory variables, there are a lot of the dependent variables that should be explained by the error term. We consider the R-squared for (1) to be good and a low for (2).

Variables	Fixed Effects Model	
	(1) Operational Expenses	(2) Portfolio Yield
Age	-0.00458891 (0.00318912)	0.00307048 (0.00400623)
Average Loan	-6.954E-06 (4.986E-06)	-6.941E-06 (8.923E-06)
Personnel Productivity	-0.00042199 *** (0.00011848)	0.0000535 (0.00004103)
GDP per Capita	-0.00002576 * (0.00001441)	-3.126E-06 (7.158E-06)
Village Loan (dummy)	0.12879357 *** (0.00841189)	0.0278563 ** (0.01228145)
Solidarity Group (dummy)	-0.00244192 (0.0136257)	-0.07709062 *** (0.02508136)
Size		-0.03116815 ** (0.01502746)
Intercept	0.36384569 *** (0.03228197)	0.84162844 *** (0.19519495)
Observations	925	1029
R-squared	0.20509547	0.0596706

(1) and (2) are regressed using operational expenses and portfolio yield as the dependent variables and utilizing fixed effects model

Operational expenses are divided by total assets, which is the reason for size not being included in (1).

Village Loan (dummy) states whether the MFIs provide loans to groups consisting of a whole village.

Solidarity Group (dummy) states whether the MFIs provide loans to smaller groups

The size variable is the ln of total assets.

Robust standard errors in parenthesis;

Statistical significance: \* p<0.10; \*\* p<0.05; \*\*\* p<0.01

Table 3: Regression results with fixed effects.

From regression (1), seen in table 3, we have two variables that are statistically significant at 1% level and one at a 10%. Our age variable is not statistically significant, which does not support our hypothesis that the age of an MFI affects the operational expenses. Even though Age is not statistically significant we note that the coefficient is negative. Furthermore, given that Age was statistically significant, this would be the expected relationship between this variable and operational expense. The other variables, except our dummy variables, have a negative relation, which was expected.

As individual loans are our base group for our dummies we need to interpret the coefficients for Village Loan and Solidarity Group in relation to individual loans. Armendáriz and Morduch (2010) perceived village loans to be an efficient form of loan methodology, and therefore the positive coefficient is not in accordance with their prediction for this variable. Furthermore, they

also perceived this loan methodology to be more cost efficient than individual loans. Our coefficient tells us that village loans are 12.88% less cost effective than individual loans. This is troublesome especially since the variable is statistically significant at a 1% level. On the other hand, this result supports the findings of Mersland and Strøm (2010a) that the cost of maintaining group loans exceeded the benefits of these loan methods. Our prediction for this variable was ambiguous, meaning we did not know where to predict the effect of this variable. The results support the claim that group loans are not as efficient as individual loans. The same interpretation can be done for solidarity group loans, but since this variable is not statistically significant at any level this is not of the biggest importance, but is something worth noticing.

Portfolio yield is supposed to cover the operational expenses, financial expenses, provision expenses and the net margin, also referred to as profit, (Hug, 2014; Rosenberg et al., 2013) and have therefore a relation to operational expenses. Therefore, as a control we want to test the age against the portfolio yield. We use the same explanatory variables as in the first regression except that we now include the natural logarithm of total assets to act as a measure of the MFI's size.

In regression (2), Age is not statistically significant supporting the results from regression (1) that the age of the MFI does not affect the operational expenses. Furthermore, both our dummies are significant, but they have different signs for the coefficients. Village loans, according to regression (2), have a portfolio yield that is 2.79% higher than the portfolio yield for individual loans. For solidarity group loans the portfolio yield is 7.71% lower than the portfolio yield for individual loans. Respectively, Village Loan and Solidarity Group are statistically significant at a 5% level for the first and 1% level for the latter. Our size measure is also statistically significant and tells us that the larger the bank the lower the portfolio yields. This is because the sign of the coefficient is negative which can also show signs of economies of scale. This is a common presumption drawn from basic economic theory.

It is a little worrying that two of the control variables that were statistically significant in regression (1) are not statistically significant in (2). Operational expenses should have an influence on the portfolio yield and therefore we thought that the results would be more similar. This can be because there are a lot more factors that influence the yield than our variables.

The complete output for the regression can be found in appendix A4, A5 and an overview of the results in appendix A6.

### *7.3 Comparing Norwegian Savings Banks and MFIs*

Norwegian savings banks and microfinance institutions are on opposite sides of the scale. It will therefore be interesting to investigate differences in the financial statements and ratios. We have



based our analysis on Mersland and Strøm (2014) article on “measuring microfinance” and taken the same accounting figures and ratios as them. They use main accounting figures for the average MFI and with these accounting figures measure the most commonly used ratios. The ratios used are ROA, Profit Margin, and OSS, which measure sustainability and profitability. Additionally, we added cost income ratio, net financial revenue and operational expenses. These ratios are highly used in Norwegian savings banks and measures efficiency. This is done to answer our third hypothesis to test whether there exist differences between the two industries.

### 7.3 1 Financial Statements

Table 4 and 5 presents the accounting figures in relation to average total assets and total revenue for both industries. The numbers here are all averages for the entire period for both microfinance institutions and Norwegian savings banks. Appendix A7 and A8 gives a more detailed presentation of table 4 and 5.

<b>Microfinance institutions</b>	<b>Mean</b>	<b>Median</b>	<b>Stand. Dev.</b>	<b>% of Total Assets</b>	<b>% of Financial Revenues</b>	<b>Obs</b>
<b>Financial Revenue</b>	<b>2.6257</b>	<b>0.9178</b>	<b>5.6267</b>	<b>30.52 %</b>	<b>100.00 %</b>	<b>2036</b>
<b>Financial expenses</b>	<b>0.5409</b>	<b>0.1144</b>	<b>1.4663</b>	<b>4.71 %</b>	<b>17.80 %</b>	<b>2163</b>
<b>Net Financial Revenue</b>	<b>2.1209</b>	<b>0.7593</b>	<b>4.4867</b>	<b>25.71 %</b>	<b>82.20 %</b>	<b>2027</b>
Loan loss provisions	0.2107	0.0422	0.7221	2.07 %	8.05 %	2165
Financial Margin	1.9178	0.7004	4.0551	23.70 %	74.52 %	2015
<b>Operational expenses</b>	<b>1.4852</b>	<b>0.6080</b>	<b>2.7559</b>	<b>21.36 %</b>	<b>84.80 %</b>	<b>2241</b>
<b>CIR</b>	<b>0.9428</b>	<b>0.7761</b>	<b>0.7315</b>			<b>1996</b>
Total assets	11.5000	4.0306	23.9000	100.00 %	445.07 %	1753
Total Portfolio	8.6466	2.8232	19.5000	89.86 %	395.20 %	2266

All numbers except CIR are in \$million

Table 4: Descriptive analysis for MFIs.

<b>Norwegian savings banks</b>	<b>Mean</b>	<b>Median</b>	<b>Stand. Dev.</b>	<b>% of Total Assets</b>	<b>% of Financial Revenues</b>	<b>Obs</b>
<b>Financial Revenue</b>	<b>18.4268</b>	<b>11.4269</b>	<b>27.8578</b>	<b>5.91 %</b>	<b>100.00 %</b>	<b>1620</b>
<b>Financial expenses</b>	<b>10.8597</b>	<b>5.9455</b>	<b>20.2222</b>	<b>3.20 %</b>	<b>53.30 %</b>	<b>1620</b>
<b>Net Financial Revenue</b>	<b>7.5671</b>	<b>5.2629</b>	<b>8.3770</b>	<b>2.71 %</b>	<b>46.70 %</b>	<b>1620</b>
Loan loss provisions	3.0398	1.8912	4.2025	1.20 %	20.38 %	1620
Financial Margin	4.5273	2.9167	5.6298	1.52 %	26.32 %	1620
<b>Operational expenses</b>	<b>5.4678</b>	<b>3.5792</b>	<b>6.6861</b>	<b>1.88 %</b>	<b>32.99 %</b>	<b>1620</b>
<b>CIR</b>	<b>0.5770</b>	<b>0.5714</b>	<b>0.1009</b>			<b>1620</b>
Total assets	357.6805	198.7627	540.1404	100.00 %	1827.24 %	1620
Total Portfolio	311.5080	181.2411	442.6953	89.30 %	1623.51 %	1620

All numbers except CIR are in \$million

Table 5: Descriptive analysis for Norwegian savings banks.

When looking at the calculations from table 4 and 5, they illustrate that financial revenue, financial expenses and operational expense constitute the largest items in the income statements for both Norwegian savings banks and Microfinance institutions. The standard deviations for the mentioned key figures are all larger than the means. This was to be expected for the MFIs, since there are a large variation in size and age, and therefore these measures will vary in the size as

well. For the Norwegian savings banks, we expected the standard deviation to be smaller. These banks also vary in size, which may explain the size of the standard deviation. How much the observations differ from the mean is measured by the variance. Since the variance is squared to eliminate the negative numbers, the standard deviation represent the variance, but in the same unit of measurement as the variables (Johannessen, Kristoffersen, & Tufte, 2004).

When looking at the two tables it is evident that there are some differences between Norwegian savings banks and MFIs. To get a better understanding of the relative sizes of the key figures, we elected to include them in percent of both total assets and financial revenue. Operational expenses and financial revenue for the MFIs are much larger relative to their total assets than for Norwegian savings banks.

If we stay with the operational expense and analyse them in percent of financial revenues, we see that the MFIs' are substantially higher than for the Norwegian savings banks. The MFIs have, on average, an operational expense that is 84.80% of their financial revenue. If we add all other costs of doing business to this equation we will get the CIR and we can see that they are just barely able to cover their costs. This leaves next to nothing for the profit, the cost of default and other expenses, including tax. On the other hand, the Norwegian savings banks' operational expenses are only 32.99% of the financial revenue and their CIR is just above 0.5. This is consistent with Mersland and Strøm (2014), that said that microfinance is a labour-intensive industry. We will further evaluate the CIR variable later in this section.

Now let us look at net financial revenue, which is calculated by subtracting financial expenses from financial revenue. Net financial revenue is the main source of income for both microfinance institutions and Norwegian savings banks. We see that in relation to the total assets the net financial revenue is substantially higher for MFIs than Norwegian savings banks. In relation to total assets, we see that the percentage for the MFIs well excides the Norwegian savings banks. If we decompose the variable and turn our focus to financial revenue and financial expenses: The size of the MFIs financial revenues in percent of total assets is 30.52%, whereas for the Norwegian savings banks they are only 5.91% However, the financial expenses divided by assets are very similar and divided by revenues the expenses is lower for MFIs than Norwegian savings banks.

These differences between these two are also very evident in the total assets in percent of financial revenue. Where the Norwegian savings banks have an asset to revenue ratio of 1827.24%, MFIs have a ratio that is more than four times lower than the Norwegian savings banks' ratio. The total portfolio for MFIs is also four times lower than the Norwegian savings banks'. However, the

portfolio in percent of total assets is almost identical, telling us that they both have the same portfolio size relative to the bank size.

Now we know which financial figures that are substantial in the financial statements and have a basic understanding of the differences. Financial revenue, financial expenses and operational expenses are the largest items in our excerpt. Further, we want to add those important financial figures into financial ratios and look at how they have been developing over the time period.

In the next part of this section we will take a look at different financial ratios.

7.3.2 Accounting Ratios

**Return on assets**

Return on assets, measures how well an MFI uses its total assets to generate returns (CGAP, 2003). From 1999 to 2009 there has been a decline from 1% to 0.15% in the American savings bank sector (Saunders & Cornett, 2011). Figure 6 illustrates that the Norwegian savings banks had a decline in the same period from 1.21% to 0.66%. They had a large dip in 2008, but they have been rather protected against the financial crisis. For Microfinance institutions however, we cannot see a decline in 2008, but an increase in ROA. For the whole period, MFIs had more or less a steady increase in ROA, even with some negative periods. The fluctuations may be a result of new microfinance institutions starting or stopping to report their financial numbers. The initial years, microfinance had a negative ROA which may be a result of few microfinance institutions in the dataset and that there are large differences between microfinance institutions in terms of profitability.

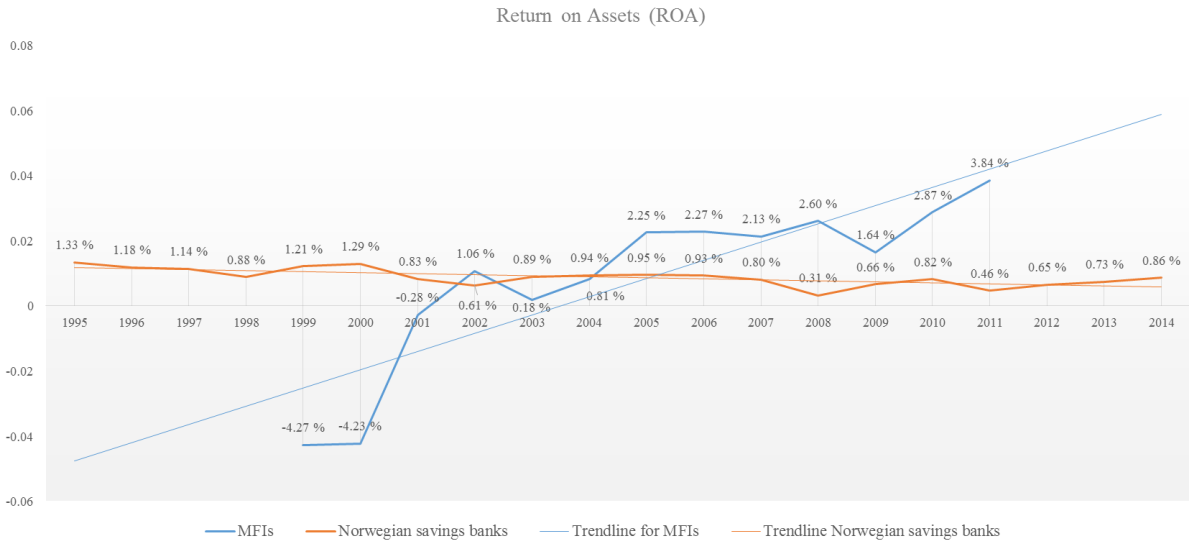


Figure 6: Comparison of Return on Assets.

**Operational profit margin**

The profit margin looks at profits relative to total revenues earned (Ledgerwood, 2014). As illustrated in figure 7, Norwegian banks fluctuate between 7.39% and 31.80%, which indicate a large variance. We see that in 2008, most likely due to the financial crises, the profit dips tremendously. However, the next couple of years there is a resurgence leading to a large increase. After another decline in 2011 the operational profit margin climbs to 27.39% in 2014. The trend for the Norwegian savings banks is slightly decreasing. The growth of the trend line is -0.0001 indicating that the trend is almost constant for this period.

Microfinance institutions have a steady increase in the operational profit margin with a few years of decline. The margin increases from -17.42% to 11.99%, which shows a clear positive trend for this key figure. Even with a decline from 2007 to 2009, the latest trends shows that the MFIs are creating higher profits.

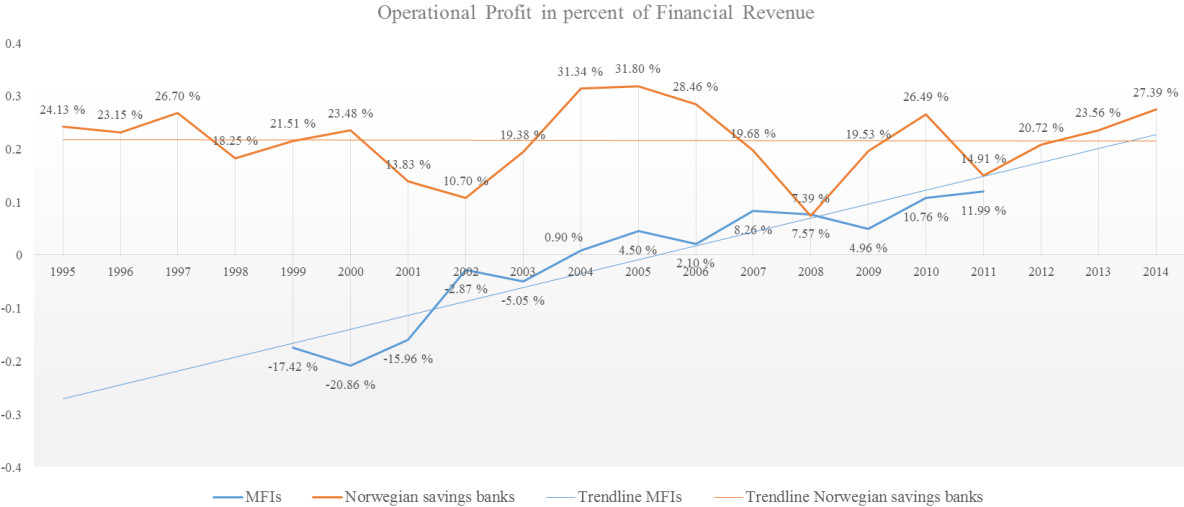


Figure 7: Comparison of the operational profit margin.

**Operational expenses**

This ratio test whether or not MFIs and Norwegian savings banks achieves greater cost-efficiency over time, with respect to operational expenses. Discussion of the operational expenses for MFIs is discussed in section 7.1. Figure 8 illustrates a clearly decreasing operating expense for Norwegian saving banks, whereas we notice that in 2010 and forwards, Norwegian savings banks seems to be hitting their minimum level. Norwegian savings banks started with a ratio of 2.70% in 1995. In the period 1995 to 2014, Norwegian savings banks have reduced their cost with 44.11%, ending up with an expense ratio of 1.51%. This is a result of the large development in the field of IT and self-service solutions, which again allows Norwegian savings banks to except reduced net financial revenue.

It is worth noticing that if we look at the period 2000 to 2011 for both industries, microfinance reduced their cost with 24.19% while Norwegian savings banks with 31.75%. It is interesting that one of the world’s most cost-efficient banks manage to reduce their cost more than microfinance considering their already low cost level.

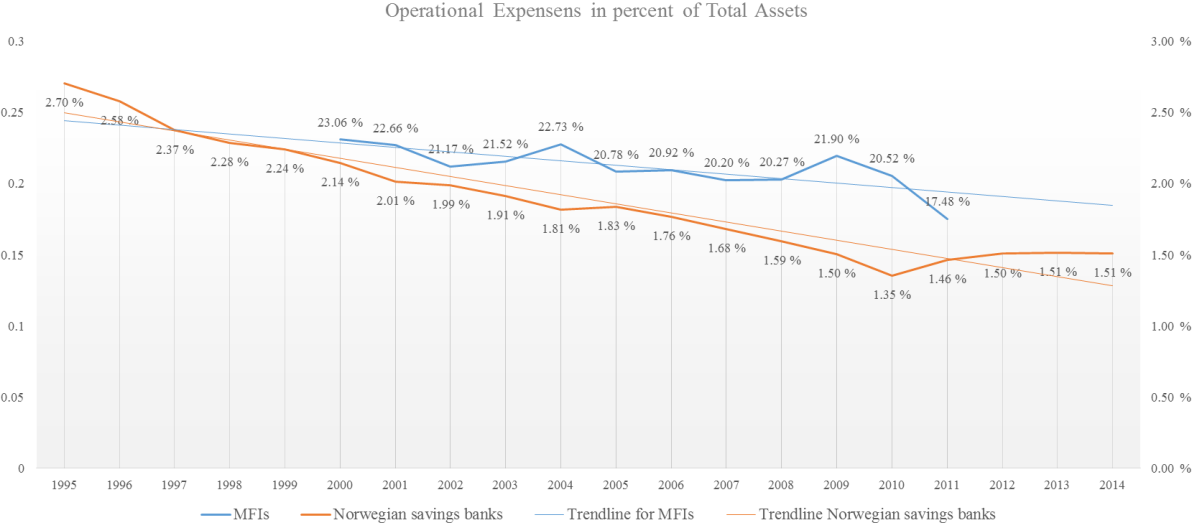


Figure 8: Comparison of operational expenses in percent of total assets.

**Operating self-sufficiency**

Operating self-sufficiency measures how well an MFI covers its costs through operating revenues (CGAP, 2003). Operating self-sufficiency is not fluctuating as much as the other ratios. Both Norwegian savings banks and microfinance institutions have a slight positive trend. Over the entire period, Norwegian savings banks are above 100%. As described in section 5.3.4, this implies that they do not rely on subsidies. When looking at microfinance for the entire period, we can see that MFIs are not sustainable the first year. This can be a result of a small set of observations the two first years. Microfinance institutions are above 100% for the rest of the period, which implies that MFIs on average also do not rely on outside funding to maintain its current level of operations.

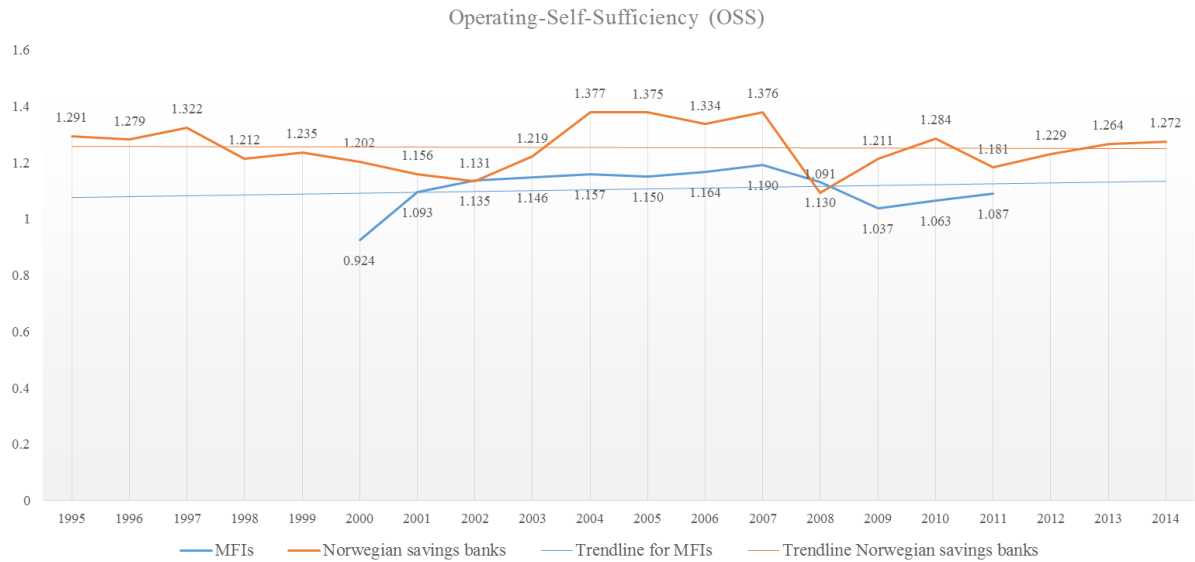


Figure 9: Comparison of the Operating Self-Sufficiency.

**Net financial revenues (net interest income)**

The net financial revenues for the Norwegian savings banks are declining towards 2010 where they level out at 1.90%. They increase slightly, but returns to 1.90% in 2014. There are no sudden dips in the net financial revenues and the trend line has a clear negative slope.

For microfinance they fluctuate a little more with a period of positive growth from 2001 to 2003. However, the next four years the net revenues decline before growing again towards 2010. Overall we see from the trend line that there is a weak, downwards trend throughout the period.

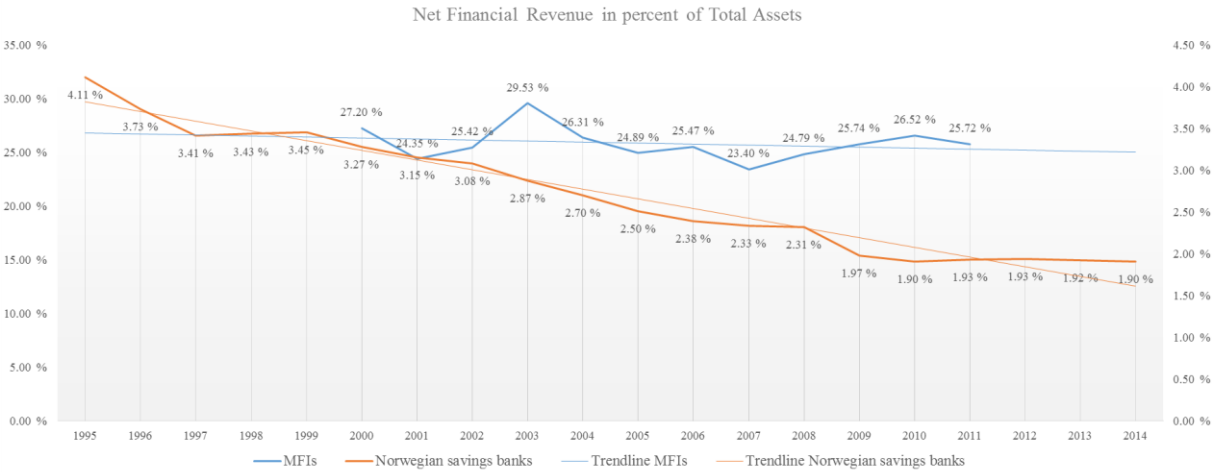


Figure 10: Comparison of net financial revenue in percent of total assets.



**Cost Income Ratio**

Cost income ratio is defined as operational expenses divided by operational revenues, which say something about the cost relative to income. Norwegian savings banks are at a significantly lower level than microfinance institutions. This indicates a good cost control and a strong focus on low costs for Norwegian savings banks. They are mainly located between 50-60%, but the trend line for the period is positive. Microfinance institutions on the other hand are located between 80-90%, but they have a negative trend. The graph illustrates in general a positive development, and improved cost-efficiency for microfinance.

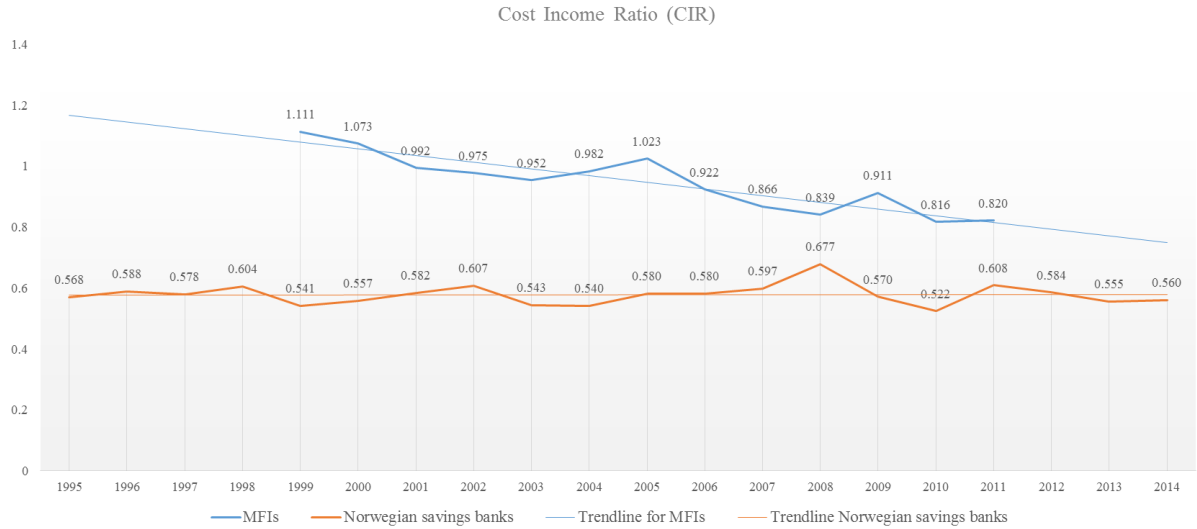


Figure 11: Comparison of the cost income ratio.

**7.3.3 Summary**

After all ratios are analysed it is clear that the trends for Norwegian savings banks are more stable compared to the MFIs, the only exception being net financial revenues in percent of total assets. However, in most cases the trends for the MFIs are converging towards the Norwegian savings banks' level. These analyses of the financial statements and development of the key figures in together with the t-tests supports hypothesis three, that there are differences between the industries.

In appendix A9, the t-test statistics for the variables used in this section are presented. We see that most of the developments for the different industries and the comparison between them are statistically significant at either a 10%, 5% or 1% level.

## *7.4 Norwegian Savings Banks' Development*

The Nordic countries have the most cost efficient banks in the world (Little, 2007; Studemann, 2007; The Economist, 2013). What have Norwegian savings banks done to become so cost-efficient?

After talked to key personnel in the Eika group through emails, they mention three actions that have been done in Norway, which are the basis of their low cost structure. Eika alliance consists of 74 savings banks, making the Eika group the biggest player in the Norwegian banking industry (Eika Group, 2016).

Three main actions that have been done in Norway, which is the basis of the low costs are:

### **1. Norwegian savings banks are small enterprises in communities**

Basically, the savings banks are often small enterprises in a community with relatively low wages and little tradition of bonus and other expensive goods compared to major financial institutions.

### **2. Cooperation between the Norwegian savings banks**

The savings banks in Norway have been good at working in larger groups, such as the Eika group and Sparebank1 group, creating possibilities for economies of scale. Shared procurement, services, product development, competence development, and information technology development are contributors to this, to mention a few.

The Eika group have 74 savings banks and all banks appear with their own online and mobile banking sites, but it is only the design and some content delivery that are different. Essentially, all applications are exactly alike and this means that the new innovative solutions, like a payment application, can be used by 74 savings banks for the same cost.

Eika is also the largest shareholder in a Danish data centre and share development costs with banks from Denmark, Sweden and the Faroe Islands.

### **3. The large bank cooperation in Norway**

The most important reason has been the large banking cooperation in Norway. Both savings banks and the former major commercial banks have a long tradition of public joint infrastructure development solutions. Infrastructure developments as joint cards solutions, ATMs, payment terminals in stores, eGiro, e-invoice, direct debits, debits and bankID to mention a few. For all these solutions, banks have shared costs and thus avoided creating their own solutions. In other countries, for example Sweden, banks have less cooperation on innovations and thus each bank had to build their own solutions in these areas. In Greece or Turkey you can find four or five

different payment terminals in stores. Or as in the US where they have not found national digital solutions and thus still operate with both giros and checks.

Norwegian banks have thus been able to develop one of the cheapest payment systems in the world, BankAxept, and one of the most efficient identity services “BankID”, which everyone has access to.

#### *7.4.1 Summary*

After this analysis of the answers from Eika group, it is clear that Norwegian savings banks have achieved their low cost structure from both domestic cooperation and alliances. Domestic cooperation between the banks in Norway has led to big developments in the banking infrastructure. While the alliances within the banks have created shared development costs of technology. This is an answer to our research question about how Norwegian savings banks have created such a low cost structure. Further discussion on the fourth hypothesis will continue in section 8.3.

## 8 Discussion

In this part of the thesis we will discuss what might be the cause of the difference between MFIs and Norwegian savings banks. We will also answer the fourth hypothesis where we look at the developments of the two markets to see what developments that are transferable and applicable for MFIs.

### 8.1 Age

For this thesis, we challenge the claim that age makes MFIs more cost efficient. There have been several studies where this relationship has been tested and some answers are ambiguous. Caudill et al. (2009) found that in East Europe and Central Asia, half of the MFIs were getting more efficient with age and the other half were not. However, Rosenberg et al. (2009) found that age affects the operational expenses by reduction in costs, but the effect weakened over time. From our regression, using fixed effects, we find that there is no significant relation between age and operational expenses. The dataset yields 925 and 1,029 observations for our two regression analyses, which we consider to be sufficient to not support our hypothesis that there is a relation between age and operational expenses.

Caudill et al. (2009) said that East Europe and Central Asia region were among the youngest in the microfinance industry and their MFIs were on average 5.57 years old. In our dataset however, the average age is twice the size at 11.39. Moreover, they had 137 observations for their age variable while our variable consists of 2,197 observations where 925 are included in the regression after all missing values were eliminated. Our data also include additional regions and therefore covers a wider spectre of the industry. This might be one explanation for why the regression results differs from the findings from Caudill et al. (2009), where for around half of their sample, age was statistically significant. Another explanation can be that they used the period 2003 to 2004, two years, while we use 1999 to 2011.

Rosenberg et al. (2009) said that age was highly significant in their regression. They used the period from 2003 to 2006 and their data were collected from Microfinance Information Exchange's database. Moreover, they weighted their variables on the Gross Loan Portfolio. On the other hand, our data is from the 'Mersland dataset' and for the period 1999 to 2011 and are weighted on total assets or not weighted at all. Some of the differences in the regression results might be explained due to this. Rosenberg et al. (2009) also eliminated all MFIs receiving any form of subsidies, where we include these banks in our sample. This will affect the results and can be a major factor for why our results differs from Rosenberg et al. (2009). The weaknesses this approach can pose, are further discussed in section 9.1.

The analyses for hypotheses one and two finds that MFIs are becoming more efficient with time, however, there is no significant relation between age and operational expenses. This support the first hypothesis, however, we cannot support the second. It can be argued that MFIs become efficient with time due to learning effects and that they make their operations more streamlined as a result of experience. One can say that this also relates to the age of the MFIs, but we want to look a little further than this. Rosenberg et al. (2009) found that economies of scale decrease as an MFI reaches 2,000 borrowers and that they have a diminishing marginal growth, meaning the growth subsides with time. We believe that MFIs have a steep learning curve in their early years but as they learn how to streamline their operations, they reach a limit for this learning curve. This implies that as they learn how to service and maintain loans more efficiently, without technological improvements their growth stagnates and the benefits of economies of scale decreases. As this technological limitation keeps them from further improve their efficiency, we argue that this might be an explanation for why age do not affect operational expenses.

## *8.2 Comparison*

The differences between MFIs and Norwegian savings banks seems to be naturally reflected by how far they have come in their market development. One can argue that Norwegian savings banks are in the mature phase, based on the areas in which they are competing, the reduction of branches and employees and the development discussed in part 3.8 and our findings in part 7.4. Norwegian savings banks are competing on elements such as prices and branding where the competitive strategy is demand driven, which include responding to their clients' needs. They are one of the most cost-efficient banks in the world and still manage to reduce costs and be even more efficient. This may be a result of what the two industries are primarily focusing on, which is a natural result of their current market development phase. MFIs are in the take-off phase (Mersland & Strøm, 2012b), were they are competing on product characteristics and service levels (Porteous, 2006). They have minor focus on prices and customers' needs and focus more on creating new lending methodologies, which is done through trial and error. Additionally, there is a social mission as well as a financial mission in microfinance (Mersland & Strøm, 2014). The social mission can be measured by the depth of outreach (Schreiner, 2002), which stated that the smaller the loan the broader the outreach. This does not enable MFIs to focus particularly on reducing costs. These industry differences in market phases may explain the differences between them rather well.

Hermes et al. (2009) found strong evidence that there exists a positive relationship between MFIs efficiency and domestic financial development. From the financial development index from 2012, Norway had a higher rank than all countries in our microfinance dataset (World Economic

Forum). The list of the countries where the MFIs operate are listed in appendix A1. Additionally, we explained in section 3.8 and 7.3 what developments that have happened in Norway, and the importance of the domestic cooperation between banks and alliances, which have contributed to the low cost structure for savings banks. While cooperation and alliances have been very important for Norwegian savings banks, Caudill et al. (2009) found that MFIs that were not in international networks tended to improve cost reductions. These differences also explain why MFIs differs from Norwegian savings banks.

When looking at some of the ratios, they indicate that MFIs have enhanced their performance. Return on assets has increased, and it has a higher yield than Norwegian savings banks. The MFIs assets have increased during the period, which may be a result of the high growth in the market, which indicates an increase in net income.

The banks main revenues are net financial revenue, and it is more or less constant as seen in figure 10. MFIs have a very weak, downward trend over the period, while Norwegian savings banks have a stronger downward trend. This might demonstrate that the competition in microfinance is not on prices, whereas competition in Norway leads to decreasing net financial revenue as a result of being in a competitive market. Let us look at the different factors of the ratio, starting with the financial revenues. In total the interest yield is declining, which makes the revenue decline, *ceteris paribus*. However, loan portfolio is increasing substantially, making the total financial revenue increase. Furthermore, the financial expenses also increase for MFIs. The fact that financial expenses are growing may imply that fewer MFIs are funded with subsidies or that there are more deposits from consumers. Caudill et al. (2009) found that MFIs who were less dependent on subsidies were associated with operating more cost effectively over time.

The operating self-sufficiency measure has a positive trend, and above 100% almost the entire period, which indicating that MFIs do not rely on subsidies. It could be argued that Cost Income Ratio might possibly be a better ratio for MFIs in the future, since CIR analyse how costs change in relation to revenue. It may be a better measure to analyse how costs change compared to revenue when operating in an industry with high operational expenses. We can clearly see a declining trend in CIR, which is positive even though the costs are still significantly high. The reduction in CIR may explain the reducing operational expenses.

Lastly, looking at possibly one of the most important factors in microfinance, operational expenses, which is the largest determinant of the interest yield (Hug, 2014; Rosenberg et al., 2013). There is a reduction in operational expenses in percent of total assets as seen in figure 8. One part of the reduction in microfinance can be argued comes from learning- and experience effects. However, it can be further argued that the MFIs have reached their maximum learning

effect under their current conditions. As there can be a limit to how streamlined they can make their operations without a larger technological development of their services. Rosenberg et al. (2009) found that microfinance achieve minor benefits from economies of scale and that they captured all benefits from economies of scale by the time they reached 2,000 clients. This is a result of MFIs only having small fixed assets and large variable costs. The findings from Hartarska et al. (2013) also indicated very little benefit from economies of scale, their results showed that serving more clients is more expensive than serving larger clients. On the other hand, Bjørnenak (2013) found that there exist economies of scale for banking sector in Norway. This helps to explain the large differences in operational expenses. Recent developments in technologies may also have reduced the operational expenses and improved efficiencies. Hermes et al. (2011) mentioned the new banking technologies such as charge cards, ATMs, cell phones and Internet banking had begun entering the microfinance industry, helping reduce costs and the delivery of services. From figure 3, we can clearly see differences from using a teller instead of ATMs or internet/mobile banking in terms of transaction costs. E.g. the need for employees for non-profit activities reduces. Measuring the effect of technology is difficult when we study the industry as a whole.

### *8.3 Innovation*

In microfinance the “discovery” of group lending was perceived to be the biggest and most important innovation (Armendáriz & Morduch, 2010). This in itself enhances the claim from Morduch (1999) that we are waiting for the next wave. Mersland and Strøm (2012b) claimed that some of the early innovations lost their importance, as other innovations were getting more important. As the individual loans were becoming more common at the expense of the group loans, they made the claim that instead of a new wave, the expansion of already implemented and functional innovations were needed. Through the statistical analysis of this thesis, we have put forth results stating that the age of the MFIs do not mean that they are more cost efficient. We have compared the MFIs with the Norwegian savings banks and even though at an already low level of cost the Norwegian savings banks are able to achieve a higher reduction in costs than MFIs. The MFIs faces challenges regarding the repayment of loans. The innovations of targeting women and issuing group loans was one way to improve the repayment rate and reduce the asymmetric information when credit scoring customers.

Now tough, MFIs are faced with high operational expenses that contributes to a high interest yield for their loans. This makes it harder for the borrowers to repay the loans since they sometimes pay half the loan amount in interests. Mersland and Strøm (2010a) stated that the cost of maintaining group loans excided the benefits of these loan methods. With group loans they meet regularly to

collect the payments and if borrowers are not able to pay, the group must find a way to do so. This takes time and can be labour-intensive. Mersland and Strøm (2012b) also said that the group loans were not needed to uphold the repayment rate. As this being the bases for issuing group loans, these previous studies and the results from our regression all point toward group loan no longer being an efficient loan methodology in today's market place.

Haare and Solheim (2012) said that, in the start of the 1990s, Norway also had several systems with different technology, which brought high fixed costs for the banks. BankAxept was implemented in the end of 1991, joining all systems in to one and was fully operational in 1995. The domestic cooperation between banks in Norway has contributed to the low cost for savings banks. This because of the joint development of banking applications and systems where the banks shared the development costs. The banks run on the same system making all banking customers able use the same bank terminals and can withdraw from all ATMs. This increased the availability at the same time it lowered the cost per customer reached. We mentioned the Eika group, an alliance consisting of 74 banks where they share most of the development costs for their technological services. Caudill et al. (2009) found that MFIs that were not in any international networks tended to improve their efficiency. Being a part of an international network might not benefit the MFIs due to the lack of domestic applicability of the technological solutions they offer. As documented, the Norwegian banking industry has managed to create stabile and effective domestic networks, which are beneficial to all participants. MFIs must cooperate among themselves or with their domestic government in an effort to create better solutions customized for their culture.

ResponsAbility (2016) mentioned in their market outlook that of the experts interviewed, the majority said that technology is the way to revolutionize microfinance. Most of the experts said that branchless banking and mobile money are the major innovations that will affect microfinance in the future.

Norwegian savings banks have been practicing partly branchless banking ever since Internet banking was introduced in 1996 and commercialized in 2000. As mentioned earlier, they have through their joint development made these services efficient and productive, reaching many borrowers. Through cooperation, MFIs can limit the costs of developing mobile systems for repaying loans, transactions and other services. By forming alliances, such as Eika, more banks, and new banks, can get access to technology that are already developed and implemented for a fee that are way below the cost of developing these systems by oneself.

When it comes to the implementation of banking technologies, Bergo (2000) in a report for Norges bank emphasized that there exists no automatic link between technology and increased



efficiency. Efficiency is created through the interaction between technology, institutions and users. Thereafter, they mention three conditions that need to be in place to get an increased efficiency through the usage of new technology. Firstly, the users of the system must be able to take advantage of the new technology. Secondly, customers must have an easy and inexpensive access to the new technology. And lastly, and perhaps the most important, the technology must encourage cost-efficient use of these technologies. The users must be given the correct prices and incentives so that their payment habits can change in the right direction (Bergo, 2000). We are analysing 473 different MFIs in 77 different countries, which makes it difficult to recommend any specific technological features. We rather recommend that MFIs consider the assumptions mentioned by Bergo (2000) when starting to implement new technologies.

Obviously, there are differences between countries both financially and culturally. The assumptions Bergo (2000) presented for efficiently adapting new technologies are intended for the Norwegian market. This means that this might not be applicable for other countries due to developmental differences. However, the success of the technological development in the Norwegian banking industry shows that they have done something right. MFIs should try to replicate them to the extent that is possible given their current technological development.

The discussion presented in this section supports the fourth hypothesis that MFIs can learn from Norwegian savings banks.

## 9 Conclusion

The objective of this thesis has been to research and identify possibilities for microfinance institutions to be more efficient by learning from Norwegian savings banks. We have done this by studying 473 microfinance institutions from 77 different countries in the period 1998 to 2012 and 81 Norwegian savings banks from the period 1995 to 2015. Based on this we have tested if MFIs are becoming more efficient with time, with respect to operational expenses. Microfinance institutions statically reduced operational expenses in percent of total assets, which implies that MFIs are becoming more efficient with time. This supports our hypothesis that MFIs are becoming more efficient with time. We then performed a panel regression to test whether age of an MFI had an effect on (1) operational expenses and (2) portfolio yield. Both regressions indicate that age does not affect operational expenses, which did not support our hypothesis that age affect operational expenses. We compared the industries financial statements and ratios to test if there exist differences. We found that, for MFIs, financial revenues, financial expenses and operational expenses constitute the largest items in the financial statement. In general, all ratios illustrated more stability for Norwegian banks, while MFIs were converging towards Norwegian savings banks. T-tests were conducted for all accounting numbers and ratios to test the differences in the means. The results of the t-tests indicate that there were significant difference between the MFIs and the Norwegian savings banks. Lastly, we looked at what actions have been done in Norway to create the low cost structure. Our results from talking with key personnel were domestic cooperation between banks, alliances within banks and technology.

The differences seem to naturally reflect the market developments phases and the fact that MFIs have a focus on social mission together with a financial mission. What microfinance can learn from Norwegian savings banks seems to not be straightforward. Technology together with domestic cooperation and alliances seems to have led to the largest improvements for the Norwegian savings banks' low cost structure. We believe that it is not accurate to recommend a specific technology, but rather that MFIs should consider the assumptions mentioned earlier for implementing technologies. Moreover, we consider that domestic cooperation and alliances can be an element MFIs can utilize when starting to use more and more technology. Through cooperation, MFIs can share development cost among several participants. International networks have not seemed to work, so domestic alliances can be more applicable for MFIs.

### *9.1 Weaknesses*

This part will outline the aspects of our analyses that we believe were not optimal and leads to weaknesses in these analyses.

When working with the MFI dataset, we did not balance it as we did for the Norwegian savings banks dataset. For our regressions, this yielded 3.4 observations per year for (1) operational expenses and 3.9 for (2) portfolio yield. For the first regression, we had at most nine observations per year and ten for the latter. With a more balanced dataset we would sacrificed some observations but then again we would have more observations per year.

In the regression analyses, we did no corrections for multicollinearity. The correlation matrixes for both regressions, found in appendix A10, shows that for (1) operational expenses, personnel productivity and average loan have a correlation of 0.3151. Furthermore, for (2) portfolio yield, size and age have a correlation of 0.3117. However, we consider the correlation of these variables to be acceptable. The rule of thumb is that all variables with a correlation higher than 0.70 indicates the presence of multicollinearity (Sekaran & Bougie, 2013). Even though none of our variables have a higher correlation than 0.70, all variables above 0.30 should be investigated further. As this has not been done, it poses as a weakness for our analyses.

Some MFIs receive subsidies and revenue may therefore be lower than their expenses. In effect, they avoid bankruptcy while still recording losses contributing to the industry looking less profitable than it really is. The fact that these MFIs are not removed from the dataset affects the means for our descriptive analysis as well as the results from the regression analysis, and might pose a considerable weakness for our study.

We speculate that the lack of technological development might explain why age is not significant in our regressions. The MFI dataset did not provide any statistics for the technological development for the country in which a particular MFI operate. Statistics of this nature can be found online, however, due to time constraints we elected not to search for this information. To further control for this, we used one country specific variable. GDP per Capita captures the economic growth of a country, however, it is hard to extract any noteworthy data for technological development from this variable. To strengthen the regressions, we should have included more variables to control for this.

## *9.2 Further Study*

There is a need for more technology studies to better understand how technological development can influence efficiency for MFIs. Also, there is a lack of studies looking at MFIs efficiency and how the cost drivers can be used to improve efficiency. Mersland and Strøm (2014) studied how to measure microfinance however there is still a need for studies comparing microfinance to other banking industries so we can better understand, and identify, areas where the microfinance “model” can improve. Some books have summarized the history of Norwegian savings banks, but

there has not been identified what specific technological innovations that had the largest impact. We also found that there is a lack of studies analysing one of the world's most efficient banking sector, and identifying how other industries can learn from them.

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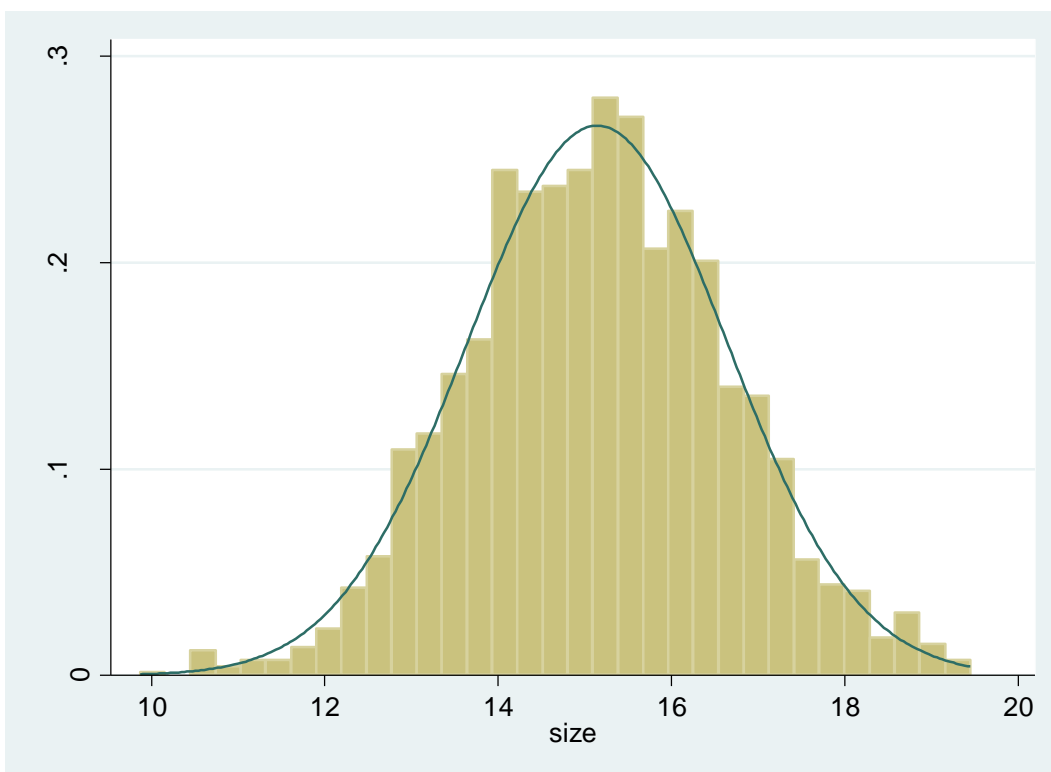
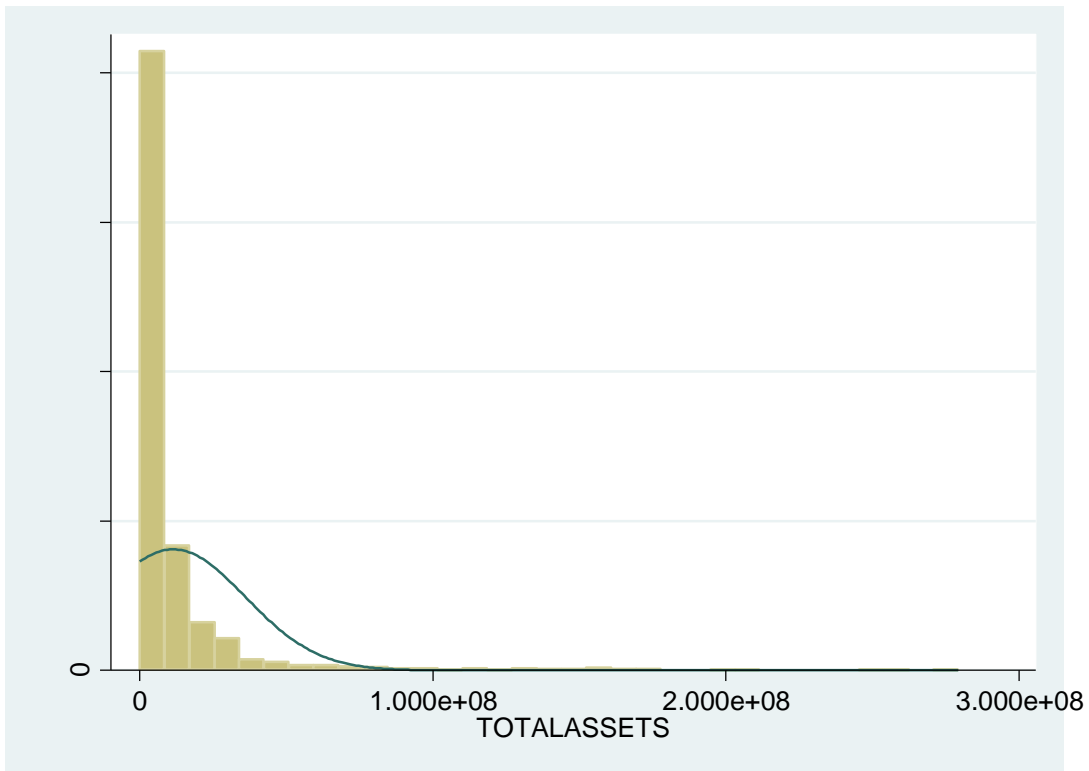
## Appendices

### *AI Country list for MFIs*

#### Country codes for MFIs

Code	Country	Number of Banks	Code	Country	Number of Banks	Code	Country	Number of Banks	Code	Country	Number of Banks
1	Albania	3	21	Honduras	9	41	South Africa	3	61	Chad	1
2	Argentina	2	22	India	32	42	Sri Lanka	2	62	Rwanda	5
3	Armenia	4	23	Indonesia	4	43	Tanzania	8	63	Zambia	3
4	Benin	8	24	Jordan	3	44	Togo	4	64	China	5
5	Bolivia	15	25	Kazakhstan	4	45	Trinidad and Tobago	1	65	Serbia	1
6	Bosnia Hercegovina	12	26	Kenya	12	46	Tunisia	1	66	Ghana	5
7	Brazil	14	27	Kyrgyzstan	5	47	Uganda	14	67	Malawi	1
8	Bulgaria	2	28	Madagascar	3	48	Montenegro	2	68	Gambia	1
9	Burkina Faso	4	29	Mali	5	49	Cameroun	5	69	Kosovo	4
10	Cambodia	14	30	Mexico	21	50	Guinee	1	70	Rep of CongoBrazz	1
11	Chile	2	31	Moldova	2	51	East Timor	1	71	Burundi	1
12	Colombia	9	32	Morocco	7	52	Bangladesh	2	72	Niger	5
13	Dominican Republic	5	33	Nicaragua	14	53	Nepal	5	73	DRC - Kinshasa	1
14	Ecuador	18	34	Pakistan	1	54	Vietnam	3	74	Afghanistan	1
15	Egypt	5	35	Paraguay	2	55	Azerbaijan	8	75	Costa Rica	1
16	El Salvador	6	36	Peru	39	56	Mongolia	2	76	Lebanon	2
17	Ethiopia	10	37	Philippines	15	57	Nigeria	5	77	Turkey	1
18	Georgia	7	38	Romania	1	58	Mozambique	1			
19	Guatemela	8	39	Russian Federation	15	59	Tajikistan	9			
20	Haiti	3	40	Senegal	11	60	Croatia	1			

*A2 Transformation of total assets variable*



### A3 Hausman test for operating expenses and portfolio yield

Variables	Coefficients		(b) - (B) Difference	sqrt(diag(V_b-V_B)) Std. Error
	(b) FE Operational exp	(B) RE Operational exp		
Age	-0.0045889	-0.0042205	-0.0003684	0.0018025
Average Loan	-6.95E-06	-0.0000197	0.0000128	3.69E-06
Personnel Productivity	-0.000422	-4.52E-04	0.0000297	0.0000574
GDP per Capita	-2.58E-05	-8.44E-06	-0.0000173	3.56E-06
Village Loan (dummy)	0.1287936	0.0967159	0.0320776	0.0743653
Solidarity Group (dummy)	-0.0024419	0.0750952	-0.0775372	0.0813808

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(4) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 1.33 \end{aligned}$$

$$\text{Prob}>\text{chi2} = 0.8568$$

Variables	Coefficients		(b) - (B) Difference	sqrt(diag(V_b-V_B)) Std. Error
	(b) FE Portfolio Yield	(B) RE Portfolio Yield		
Age	0.0030705	-0.0027963	0.0058667	0.0026353
Size	-0.0311682	-0.0202379	-0.0109303	0.0065875
Average Loan	-6.94E-06	-0.000019	0.0000121	3.48E-06
Personnel Productivity	0.0000535	-3.62E-06	0.0000571	0.0000167
GDP per Capita	-3.13E-06	0.0000105	-0.0000136	3.75E-06
Village Loan (dummy)	0.0278563	0.0511106	-0.0232543	0.0825744
Solidarity Group (dummy)	-0.0770906	0.054554	-0.1316446	0.0765874

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(5) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 17.82 \end{aligned}$$

$$\text{Prob}>\text{chi2} = 0.0032$$

## A4 Regression output for operating expenses in percent of total assets

Fixed-effects (within) regression  
Group variable: BANKS

Number of obs = 925  
Number of groups = 269

R-sq:

within = 0.2051  
between = 0.0105  
overall = 0.0389

Obs per group:

min = 1  
avg = 3.4  
max = 9

corr(u\_i, Xb) = -0.4114

F(5,266) =  
Prob > F =

(Std. Err. adjusted for 269 clusters in BANKS)

Operational Expenses % of Total Assets	Robust		t	P> t	[95% Conf. Interval]	
	Coef.	Std. Err.				
Age	-0.0045889	0.0031891	-1.38	0.168	-0.0104645	0.0018282
Average Loan	-0.00000742	0.00000498	-1.49	0.137	-0.0000172	0.00000238
Personnel Productivity	-0.0004245	0.0001184	-3.59	0.000	-0.0006576	-0.0001914
GDP per Capita	-0.0000026	0.0000144	-1.81	0.072	-0.0000543	0.00000232
Village Loan (dummy)	0.1295131	0.0082401	15.72	0.000	0.1132895	0.1457366
Solidarity Group (dummy)	-0.0031796	0.0136257	-0.23	0.816	-0.0300066	0.0236474
Intercept	0.36237	0.0320431	11.31	0.000	0.2992817	0.4254583
sigma_u	0.15157486					
sigma_e	0.06691728					
rho	0.83688687 (fraction of variance due to u_i)					

Random-effects GLS regression  
Group variable: BANKS

Number of obs = 925  
Number of groups = 269

R-sq:

within = 0.1774  
between = 0.1157  
overall = 0.1648

Obs per group:

min = 1  
avg = 3.4  
max = 9

corr(u\_i, X) = 0 (assumed)

Wald chi2(6) = 89.14  
Prob > F = 0.0000

(Std. Err. adjusted for 269 clusters in BANKS)

Operational Expenses % of Total Assets	Robust		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
Age	-0.0042205	0.0009613	-4.39	0.000	-0.0061047	-0.0023364
Average Loan	-0.0000197	3.48E-06	-5.66	0.000	-0.0000265	-0.0000129
Personnel Productivity	-0.0004516	0.0000816	-5.54	0.000	-0.0006115	-0.0002918
GDP per Capita	-8.44E-06	6.38E-06	-1.32	0.186	-0.0000209	4.08E-06
Village Loan (dummy)	0.0967159	0.0253264	3.82	0.000	0.0470770	0.1463549
Solidarity Group (dummy)	0.0750952	0.0199328	3.77	0.000	0.0360277	0.1141628
Intercept	0.3168181	0.0315567	10.04	0.000	0.2549681	0.3786680
sigma_u	0.11548032					
sigma_e	0.06697891					
rho	0.74827711 (fraction of variance due to u_i)					

## A5 Regression output for portfolio yield

Fixed-effects (within) regression  
Group variable: BANKS

Number of obs = 1,029  
Number of groups = 267

R-sq:

within = 0.0597  
between = 0.0047  
overall = 0.0007

Obs per group:

min = 1  
avg = 3.9  
max = 10

corr(u\_i, Xb) = -0.3254

F(5,266) =  
Prob > F =

(Std. Err. adjusted for 267 clusters in BANKS)

Portfolio Yield	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
Age	0.0030705	0.0040062	0.77	0.444	-0.0048175	0.0109584
Size	-0.0311682	0.0150275	-2.07	0.039	-0.0607561	-0.0015803
Average Loan	-6.94E-06	8.92E-06	-0.78	0.437	-0.0000245	1.06E-05
Personnel Productivity	0.0000535	0.000041	1.30	0.193	-0.0000273	0.0001343
GDP per Capita	-3.13E-06	7.16E-06	-0.44	0.663	-0.0000172	0.000011
Village Loan (dummy)	0.0278563	0.0122815	2.27	0.024	0.0036751	0.0520375
Solidarity Group (dummy)	-0.0770906	0.0250814	-3.07	0.002	-0.1264739	-0.0277074
Intercept	0.8416284	0.1951949	4.31	0.000	0.4573048	1.225952
sigma_u	0.1922148					
sigma_e	0.07777559					
rho	0.85931011 (fraction of variance due to u_i)					

Random-effects GLS regression  
Group variable: BANKS

Number of obs = 1,029  
Number of groups = 267

R-sq:

within = 0.0377  
between = 0.1713  
overall = 0.2067

Obs per group:

min = 1  
avg = 3.9  
max = 10

corr(u\_i, X) = 0 (assumed)

Wald chi2(7) = 46.53  
Prob > F = 0.0000

(Std. Err. adjusted for 267 clusters in BANKS)

Portfolio Yield	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
Age	-0.0027963	0.001227	-2.28	0.023	-0.0052012	-0.0003913
Size	-0.0202379	0.0085426	-2.37	0.018	-0.0369811	-0.0034947
Average Loan	-0.000019	6.74E-06	-2.82	0.005	-0.0000322	-5.80E-06
Personnel Productivity	-3.62E-06	0.0000402	-0.09	0.928	-0.0000824	0.0000751
GDP per Capita	0.0000105	4.24E-06	2.47	0.013	2.18E-06	0.0000188
Village Loan (dummy)	0.0511106	0.0302253	1.69	0.091	-0.00813	0.1103512
Solidarity Group (dummy)	0.054554	0.0263009	2.07	0.038	0.0030051	0.1061028
Intercept	0.6824959	0.1230586	5.55	0.000	0.4413056	0.9236863
sigma_u	0.1517795					
sigma_e	0.07777559					
rho	0.7920295 (fraction of variance due to u_i)					

## A6 Overview of the regression results with both fixed effects and random effects

Variables	Fixed Effects Model		Random Effects Model	
	(1) Operational Expenses	(2) Portfolio Yield	(3) Operational Expenses	(4) Portfolio Yield
Age	-0.00458891 (0.00318912)	0.00307048 (0.00400623)	-0.00422054 *** (0.00096132)	-0.00279626 ** (0.00122704)
Average Loan	-6.954E-06 (4.986E-06)	-6.941E-06 (8.923E-06)	-0.00001971 *** (3.481E-06)	-0.00001901 *** 6.740E-06
Personnel Productivity	-0.00042199 *** (0.00011848)	0.0000535 (0.00004103)	-0.00045164 *** (0.00008156)	(-3.621E-06) (0.00004018)
GDP per Capita	-0.00002576 * (0.00001441)	-3.126E-06 (7.158E-06)	-8.436E-06 (6.384E-06)	0.00001048 ** (4.235E-06)
Village Loan (dummy)	0.12879357 *** (0.00841189)	0.0278563 ** (0.01228145)	0.09671594 *** (0.02532645)	0.05111061 * (0.03022535)
Solidarity Group (dummy)	-0.00244192 (0.0136257)	-0.07709062 *** (0.02508136)	0.07509525 *** (0.01993278)	0.05455398 ** (0.02630092)
Size		-0.03116815 ** (0.01502746)		-0.0202379 ** (0.00854259)
Intercept	0.36384569 *** (0.03228197)	0.84162844 *** (0.19519495)	0.31681808 *** (0.03155667)	0.68249592 *** (0.12305856)
Observations	925	1029	925	1029
R-squared	0.20509547	0.0596706	0.16482955	0.20666281

(1) and (2) are regressed using operational expenses and portfolio yield as the dependent variables and utilizing fixed effects model.

(3) and (4) are regressed using operational expenses and portfolio yield as the dependent variables and utilizing random effects model.

Operational expenses are divided by total assets, which is the reason for size not being included in (1) and (3).

Village Loan (dummy) states whether the MFIs provide loans to groups consisting of a whole village.

Solidarity Group (dummy) states whether the MFIs provide loans to smaller groups

The size variable is the ln of total assets.

Robust standard errors in parenthesis; Statistical significance: \* p<0.10; \*\* p<0.05; \*\*\* p<0.01

## A7 Detailed descriptive analysis for Norwegian savings banks

Norwegian savings banks									
Years	Financial Revenue	Financial expenses	Net Financial Revenue	Loan loss provisions	Financial Margin	Operational expenses	CIR	Total assets	Total Portfolio
1995	7.9973	3.8146	4.1828	1.8858	2.2969	2.8054	0.5681	104.1872	90.2012
1996	7.9671	3.8602	4.1069	1.8402	2.2668	2.8119	0.5882	112.6548	99.9036
1997	6.6917	2.9526	3.7391	1.6080	2.1312	2.6456	0.5781	112.9929	102.7818
1998	8.2015	4.3110	3.8905	1.6017	2.2888	2.5915	0.6036	117.3445	107.6590
1999	10.0932	5.8763	4.2170	1.7099	2.5071	2.7570	0.5409	128.3207	119.9959
2000	9.9371	5.9135	4.0236	1.8268	2.1969	2.6960	0.5572	131.5195	123.6208
2001	12.2770	7.9557	4.3213	2.0095	2.3117	2.8103	0.5822	146.8048	137.4920
2002	15.1200	9.7991	5.3209	2.5218	2.7991	3.4187	0.6068	185.2859	173.9192
2003	14.7025	8.5280	6.1746	3.0768	3.0978	4.1001	0.5430	232.5893	221.0229
2004	11.3616	4.6234	6.7382	3.3205	3.4176	4.5373	0.5403	275.2242	262.0868
2005	13.0123	5.6758	7.3365	3.1492	4.1874	5.2179	0.5803	322.6810	303.2919
2006	16.8006	8.8968	7.9039	2.2767	5.6272	5.6697	0.5798	365.8204	345.9260
2007	26.9629	17.2765	9.6864	2.1451	7.5413	6.8874	0.5970	464.3322	434.4475
2008	42.0630	30.1545	11.9085	4.0260	7.8826	8.3241	0.6766	579.4048	515.2401
2009	26.3649	16.5511	9.8138	4.1456	5.6681	7.5356	0.5698	551.2141	462.1577
2010	25.4413	14.8641	10.5772	4.5366	6.0406	7.5579	0.5225	613.4770	500.7053
2011	28.9422	17.2746	11.6676	5.1848	6.4828	9.0374	0.6078	669.3748	546.0529
2012	28.5553	16.8853	11.6700	4.9610	6.7091	9.2303	0.5840	668.5876	555.9873
2013	28.7499	16.5889	12.1610	4.6448	7.5162	9.4228	0.5548	693.4983	569.1842
2014	27.2941	15.3916	11.9025	4.3252	7.5773	9.2989	0.5596	678.2967	558.4831
<b>Mean</b>	<b>18.4268</b>	<b>10.8597</b>	<b>7.5671</b>	<b>3.0398</b>	<b>4.5273</b>	<b>5.4678</b>	<b>0.5770</b>	<b>357.6805</b>	<b>311.5080</b>

As a percentage of financial revenues for Norwegian savings banks									
Years	Financial Revenue	Financial expenses	Net Financial Revenue	Loan loss provisions	Financial Margin	Operational expenses	CIR	Total assets	Total Portfolio
1995	100.00 %	46.94 %	53.06 %	24.32 %	28.74 %	35.13 %	0.5681	1296.21 %	1112.97 %
1996	100.00 %	47.98 %	52.02 %	23.18 %	28.85 %	35.39 %	0.5882	1402.50 %	1226.42 %
1997	100.00 %	43.55 %	56.45 %	24.97 %	31.48 %	39.46 %	0.5781	1666.25 %	1491.01 %
1998	100.00 %	51.41 %	48.59 %	21.26 %	27.33 %	32.52 %	0.6036	1423.79 %	1288.21 %
1999	100.00 %	56.66 %	43.34 %	18.70 %	24.64 %	28.22 %	0.5409	1261.30 %	1153.37 %
2000	100.00 %	57.12 %	42.88 %	20.66 %	22.21 %	27.87 %	0.5572	1314.54 %	1216.60 %
2001	100.00 %	62.51 %	37.49 %	18.59 %	18.90 %	24.10 %	0.5822	1193.84 %	1101.06 %
2002	100.00 %	62.34 %	37.66 %	19.13 %	18.53 %	24.36 %	0.6068	1226.12 %	1135.04 %
2003	100.00 %	55.25 %	44.75 %	23.66 %	21.09 %	29.73 %	0.5430	1568.15 %	1459.61 %
2004	100.00 %	36.45 %	63.55 %	33.91 %	29.64 %	42.88 %	0.5403	2382.84 %	2228.96 %
2005	100.00 %	37.81 %	62.19 %	30.66 %	31.53 %	45.66 %	0.5803	2504.33 %	2336.74 %
2006	100.00 %	46.43 %	53.57 %	18.64 %	34.93 %	39.78 %	0.5798	2260.06 %	2118.95 %
2007	100.00 %	59.04 %	40.96 %	11.32 %	29.63 %	29.51 %	0.5970	1765.44 %	1657.12 %
2008	100.00 %	67.52 %	32.48 %	11.39 %	21.08 %	22.37 %	0.6766	1406.96 %	1256.60 %
2009	100.00 %	58.00 %	42.00 %	18.05 %	23.95 %	32.06 %	0.5698	2142.66 %	1830.56 %
2010	100.00 %	54.78 %	45.22 %	18.17 %	27.05 %	31.49 %	0.5225	2396.92 %	1990.09 %
2011	100.00 %	56.47 %	43.53 %	19.29 %	24.24 %	33.18 %	0.6078	2277.14 %	1909.24 %
2012	100.00 %	56.14 %	43.86 %	18.10 %	25.76 %	34.25 %	0.5840	2283.60 %	1946.70 %
2013	100.00 %	55.21 %	44.79 %	17.17 %	27.62 %	35.42 %	0.5548	2348.88 %	1983.12 %
2014	100.00 %	54.31 %	45.69 %	16.44 %	29.25 %	36.40 %	0.5596	2423.28 %	2027.90 %
<b>Mean</b>	<b>100.00 %</b>	<b>53.30 %</b>	<b>46.70 %</b>	<b>20.38 %</b>	<b>26.32 %</b>	<b>32.99 %</b>	<b>0.5770</b>	<b>1827.24 %</b>	<b>1623.51 %</b>



As a percentage of total assets for Norwegian savings banks

Years	Net						CIR	Total assets	Total Portfolio
	Financial Revenue	Financial expenses	Financial Revenue	Loan loss provisions	Financial Margin	Operational expenses			
1995	7.74 %	3.63 %	4.11 %	1.90 %	2.21 %	2.72 %	0.5681	100.00 %	85.97 %
1996	7.15 %	3.43 %	3.73 %	1.67 %	2.06 %	2.53 %	0.5882	100.00 %	87.61 %
1997	6.03 %	2.62 %	3.41 %	1.51 %	1.90 %	2.37 %	0.5781	100.00 %	89.57 %
1998	7.05 %	3.62 %	3.43 %	1.50 %	1.93 %	2.29 %	0.6036	100.00 %	90.68 %
1999	7.95 %	4.50 %	3.45 %	1.50 %	1.95 %	2.24 %	0.5409	100.00 %	91.57 %
2000	7.63 %	4.35 %	3.27 %	1.58 %	1.69 %	2.13 %	0.5572	100.00 %	92.65 %
2001	8.39 %	5.25 %	3.15 %	1.56 %	1.58 %	2.02 %	0.5822	100.00 %	92.29 %
2002	8.17 %	5.09 %	3.08 %	1.57 %	1.51 %	1.99 %	0.6068	100.00 %	92.62 %
2003	6.40 %	3.53 %	2.87 %	1.52 %	1.35 %	1.90 %	0.5430	100.00 %	93.12 %
2004	4.23 %	1.54 %	2.70 %	1.44 %	1.26 %	1.81 %	0.5403	100.00 %	93.57 %
2005	4.02 %	1.52 %	2.50 %	1.23 %	1.27 %	1.83 %	0.5803	100.00 %	93.38 %
2006	4.46 %	2.07 %	2.38 %	0.83 %	1.55 %	1.76 %	0.5798	100.00 %	93.82 %
2007	5.69 %	3.36 %	2.33 %	0.64 %	1.68 %	1.68 %	0.5970	100.00 %	93.89 %
2008	7.13 %	4.81 %	2.31 %	0.82 %	1.50 %	1.59 %	0.6766	100.00 %	89.32 %
2009	4.70 %	2.73 %	1.97 %	0.85 %	1.13 %	1.50 %	0.5698	100.00 %	85.41 %
2010	4.21 %	2.31 %	1.90 %	0.76 %	1.14 %	1.32 %	0.5225	100.00 %	83.01 %
2011	4.42 %	2.49 %	1.93 %	0.85 %	1.08 %	1.46 %	0.6078	100.00 %	83.88 %
2012	4.40 %	2.47 %	1.93 %	0.80 %	1.14 %	1.50 %	0.5840	100.00 %	85.32 %
2013	4.28 %	2.36 %	1.92 %	0.73 %	1.19 %	1.51 %	0.5548	100.00 %	84.57 %
2014	4.14 %	2.25 %	1.90 %	0.69 %	1.21 %	1.51 %	0.5596	100.00 %	83.77 %
<b>Mean</b>	<b>5.91 %</b>	<b>3.20 %</b>	<b>2.71 %</b>	<b>1.20 %</b>	<b>1.52 %</b>	<b>1.88 %</b>	<b>0.5770</b>	<b>100.00 %</b>	<b>89.30 %</b>

## *A8 Detailed descriptive analysis for MFIs*

The averages for each year and the total averages do not add up as they do for the Norwegian savings banks. This is due to the uneven nature of the dataset. As long as there are differences in the number of observations per year they will not add up. The mean is represented by the total mean and each year has the average for that particular year.

<b>Microfinance institutions</b>										
<b>Years</b>	<b>Financial Revenue</b>	<b>Financial expenses</b>	<b>Net</b>				<b>Operational expenses</b>	<b>CIR</b>	<b>Total assets</b>	<b>Total Portfolio</b>
			<b>Financial Revenue</b>	<b>Loan loss provisions</b>	<b>Financial Margin</b>					
1995										
1996										
1997										
1998										
1999	1.3457	0.2743	1.1086	0.1366	0.9430	0.7614	1.1110	3.5716	7.2988	
2000	1.4981	0.2701	1.2394	0.1403	1.1103	0.8631	1.0729	3.3018	5.6618	
2001	1.5024	0.3534	1.1490	0.1241	1.0350	0.8378	0.9923	4.0482	7.6767	
2002	1.6020	0.2737	1.3284	0.1281	1.2003	0.9718	0.9754	4.8946	7.4601	
2003	1.9054	0.2448	1.6606	0.1089	1.5552	1.0333	0.9523	4.8147	8.6114	
2004	1.5748	0.2429	1.3432	0.1025	1.2426	0.9126	0.9818	4.9527	7.1333	
2005	1.4770	0.2454	1.2420	0.0858	1.1560	0.8727	1.0235	4.6684	6.4222	
2006	1.9264	0.3482	1.5869	0.1239	1.4683	1.0850	0.9216	6.5118	7.0124	
2007	3.0322	0.6676	2.3821	0.2018	2.1868	1.5984	0.8662	10.9276	11.1680	
2008	5.0243	1.1713	3.8972	0.4442	3.4987	2.5698	0.8389	17.4090	19.9536	
2009	5.8875	1.2845	4.6326	0.6223	3.9948	3.1925	0.9105	18.5151	21.7229	
2010	7.5918	1.4158	6.0232	0.5791	5.4014	3.7927	0.8158	22.5765	24.4580	
2011	4.6625	1.1849	3.5820	0.2227	3.4688	2.9645	0.8204	18.1155	19.2287	
2012										
2013										
2014										
<b>Mean</b>	<b>2.6257</b>	<b>0.5409</b>	<b>2.1209</b>	<b>0.2107</b>	<b>1.9178</b>	<b>1.4852</b>	<b>0.9428</b>	<b>11.5000</b>	<b>8.6466</b>	

**As a percentage of financial revenues for microfinance institutions**

Years	Net						CIR	Total assets	Total Portfolio
	Financial Revenue	Financial expenses	Financial Revenue	Loan loss provisions	Financial Margin	Operational expenses			
1995									
1996									
1997									
1998									
1999	100.00 %	12.48 %	87.52 %	7.18 %	80.38 %	101.52 %	1.1110	325.37 %	300.35 %
2000	100.00 %	25.65 %	74.35 %	10.74 %	67.35 %	103.92 %	1.0729	365.33 %	506.79 %
2001	100.00 %	19.25 %	80.75 %	11.14 %	70.34 %	94.27 %	0.9923	473.26 %	437.68 %
2002	100.00 %	16.86 %	83.14 %	7.16 %	75.56 %	86.69 %	0.9754	483.70 %	384.72 %
2003	100.00 %	14.39 %	85.61 %	9.09 %	76.68 %	98.55 %	0.9523	514.32 %	405.93 %
2004	100.00 %	14.90 %	85.10 %	7.86 %	77.37 %	99.88 %	0.9818	431.81 %	422.20 %
2005	100.00 %	16.96 %	83.04 %	5.90 %	77.33 %	85.30 %	1.0235	490.80 %	415.64 %
2006	100.00 %	17.77 %	82.23 %	7.28 %	75.46 %	79.15 %	0.9216	446.39 %	399.11 %
2007	100.00 %	20.43 %	79.57 %	8.27 %	71.55 %	73.33 %	0.8662	440.56 %	399.72 %
2008	100.00 %	19.63 %	80.37 %	8.30 %	72.85 %	67.76 %	0.8389	372.18 %	342.63 %
2009	100.00 %	20.23 %	79.77 %	10.26 %	70.06 %	72.71 %	0.9105	383.54 %	321.28 %
2010	100.00 %	19.34 %	80.66 %	7.71 %	72.47 %	66.45 %	0.8158	378.26 %	323.88 %
2011	100.00 %	18.39 %	81.61 %	3.79 %	77.79 %	66.99 %	0.8204	418.92 %	337.26 %
2012									
2013									
2014									
<b>Mean</b>	<b>100.00 %</b>	<b>17.80 %</b>	<b>82.20 %</b>	<b>8.05 %</b>	<b>74.52 %</b>	<b>84.80 %</b>	<b>0.9428</b>	<b>445.07 %</b>	<b>395.20 %</b>

**As a percentage of total assets for microfinance institutions**

Years	Net						CIR	Total assets	Total Portfolio
	Financial Revenue	Financial expenses	Financial Revenue	Loan loss provisions	Financial Margin	Operational expenses			
1995									
1996									
1997									
1998									
1999	33.92 %	4.28 %	29.64 %	2.96 %	26.68 %	15.35 %	1.1110	100.00 %	85.98 %
2000	31.91 %	5.11 %	27.20 %	2.46 %	24.56 %	24.19 %	1.0729	100.00 %	83.02 %
2001	28.78 %	4.43 %	24.35 %	2.02 %	22.75 %	23.56 %	0.9923	100.00 %	83.49 %
2002	29.02 %	3.60 %	25.42 %	1.70 %	23.72 %	20.67 %	0.9754	100.00 %	82.04 %
2003	33.24 %	3.71 %	29.53 %	2.13 %	27.45 %	21.45 %	0.9523	100.00 %	86.16 %
2004	30.56 %	4.26 %	26.31 %	1.94 %	24.39 %	22.81 %	0.9818	100.00 %	88.19 %
2005	29.37 %	4.48 %	24.89 %	1.63 %	23.29 %	21.28 %	1.0235	100.00 %	86.96 %
2006	30.26 %	4.71 %	25.47 %	2.09 %	23.33 %	21.29 %	0.9216	100.00 %	92.08 %
2007	28.80 %	5.11 %	23.55 %	2.03 %	21.51 %	20.38 %	0.8662	100.00 %	97.09 %
2008	31.28 %	5.65 %	25.04 %	2.51 %	23.08 %	20.13 %	0.8389	100.00 %	96.66 %
2009	31.86 %	5.62 %	25.74 %	2.85 %	22.86 %	21.89 %	0.9105	100.00 %	88.56 %
2010	32.57 %	5.48 %	26.52 %	2.18 %	24.04 %	21.57 %	0.8158	100.00 %	90.53 %
2011	31.17 %	4.98 %	25.72 %	1.47 %	24.37 %	19.55 %	0.8204	100.00 %	91.99 %
2012									
2013									
2014									
<b>Mean</b>	<b>30.52 %</b>	<b>4.71 %</b>	<b>25.71 %</b>	<b>2.07 %</b>	<b>23.70 %</b>	<b>21.36 %</b>	<b>0.9428</b>	<b>100.00 %</b>	<b>89.86 %</b>

## A9 T-tests

<b>T-test statistics</b>	<b>Microfinance Institutions</b>	<b>Norwegian Savings Banks</b>	<b>MFI's against NSB</b>
Operational Expenses % Assets	0.0822 *	0.0000 ***	0.0000 ***
Financial Revenue	0.0006 ***	0.0000 ***	0.0000 ***
Financial Expenses	0.0058 ***	0.0000 ***	0.0000 ***
Net Financial Revenue	0.0004 ***	0.0000 ***	0.0000 ***
Loan Loss Provisions	0.3050	0.0002 ***	0.0000 ***
Financial Margin	0.0002 ***	0.0000 ***	0.0000 ***
Operational Expenses	0.0000 ***	0.0000 ***	0.0000 ***
CIR	0.1256	0.5210	0.0000 ***
Total Assets	0.0009 ***	0.0000 ***	0.0000 ***
Total Portfolio	0.0004 ***	0.0000 ***	0.0000 ***
ROA	0.0282 **	0.0000 ***	0.0619 *
Operational Profit % Revenues	0.0666 *	0.0084 ***	0.0014 ***
OSS	0.1676	0.2377	0.0000 ***

The first column indicates whether there is a significant statistical difference in the means for the first year for MFIs against the last year.

The second column indicates the same as the first, only for Norwegian savings banks rather than MFIs

The last column indicates whether there is a significant statistical difference in the means between MFIs and Norwegian savings banks.

Statistical significance: \* p<0.10; \*\* p<0.05; \*\*\* p<0.01

## *A10 Correlation matrixes*

	Portfolio Yield	Age	Size	Average Loan	Personnel Productivity	GDP per Capita	Village Loan (dummy)	Solidarity Group (dummy)
Portfolio Yield	1							
Age	-0.2158	1						
Size	-0.1839	0.3117	1					
Average Loan	-0.2929	0.0212	0.2052	1				
Personnel Productivity	-0.0288	0.0775	0.0861	-0.2724	1			
GDP per Capita	0.2295	-0.0287	0.072	0.1434	-0.0907	1		
Village Loan (dummy)	0.1273	0.1127	-0.0715	-0.1167	0.1872	0.0045	1	
Solidarity Group (dummy)	0.1922	-0.1458	-0.2191	-0.1913	0.1948	-0.0953	-0.2517	1

	Operational Expenses	Age	Average Loan	Personnel Productivity	GDP per Capita	Village Loan (dummy)	Solidarity Group (dummy)
Operational Expenses	1						
Age	-0.1817	1					
Average Loan	-0.2632	0.0274	1				
Personnel Productivity	-0.0529	0.0499	-0.3151	1			
GDP per Capita	0.0535	-0.0294	0.1767	-0.0955	1		
Village Loan (dummy)	0.1898	0.1089	-0.1176	0.2253	-0.0316	1	
Solidarity Group (dummy)	0.1868	-0.1454	-0.2154	0.2634	-0.0799	-0.2545	1

## **Reflection Note**

Microfinance institutions are seeing high growth in their industry, but faces challenges with financial viability and high cost. The Norwegian savings banks have one of the world's most efficient banking systems and have focused on cost-efficiencies over period of 50 years. The objective of this thesis has been to research and identify possibilities for microfinance institutions to be more efficient by learning from Norwegian savings banks. We employ a large dataset of 473 microfinance institutions from 77 different countries spanning 14 years and 81 Norwegian savings banks spanning 20 years. Additionally, we have studied developments in the Norwegian market, different market phases, accounting figures and ratios and other different aspects on the matter to try to establish possible factors that are transferable into microfinance.

We find that both industries increase their efficiencies by statistically reducing operational expenses in percent of total assets. Our panel regressions show that age of an MFI affect neither operational expenses, nor portfolio yield, which imply that we cannot support our hypothesis that age has an effect on operational expenses. Further, we found differences in the financial statements and ratios, whereas Norwegian savings banks tended to be more stable while MFI converged towards them. Lastly, we found that cooperation between banks and alliances within banks are the main actions that have created the low cost structure in Norway.

The differences seem to naturally reflect the market developments phases and the fact that MFIs have a focus on social mission, hence the focus on costs is not prioritized. What microfinance can learn from Norwegian savings banks seems not to be straightforward. Technology together with cooperation between banks and alliances within banks seems to have led to the largest improvements for the Norwegian savings banks' cost structure with e.g. shared development costs. Cooperation and alliances can be an element microfinance can utilize when starting to use more and more technology. International networks have not seemed to work, so domestic alliances can be more appropriate for MFIs.

## **International Trends**

ResponsAbility (2016) publishes a market outlook every year, which focuses on development, forecasts and trends. The major international trends for microfinance the next years will be technology, and several experts say that technology can transform the microfinance industry. The important technological factors are branchless banking, mobile money and credit scoring.

Branchless banking is delivering financial service without the customers' physical need to visit the local bank branch. Mobil money, or mobile banking, is a service provided by the MFI that allows its customers to preform financial transactions by only using a mobile device. Branchless

banking and mobile banking can help the microfinance industry tremendously by lowering its transactional costs, and reducing the need for employees performing non-profit activities. This is important for microfinance institutions due to their high operational expenses, where wages is a large item. The next trend is credit scoring or credit bureaus. They can help reduce the asymmetric information, which can lead to reduced default costs, and improve the repayment rate. All these technological trends are crucial for microfinance, and can resolve the worries regarding financial viability and maybe survival. All these technological features already exist today, and the question is how microfinance can implement them in the best possible way? A possible way of implementation is cooperation between commercial banks that already utilizes these technological features and microfinance institutions. Through this, the commercial bank can show their corporate social responsibility, which is important, as people are more concerned about image and brand.

## **Innovation**

Microfinance in itself has been an innovation as it created new markets and targeted customers that other banks had not bothered reaching. The innovations done in microfinance can be summarized into five sections, (1) targeting of poor customers, (2) targeting of women, (3) new lending technologies, (4) new organizational solutions, and (5) new sources of funding (Mersland & Strøm, 2012b). Microfinance is coming of age, and there are a large need for new innovation. The international trends explained above can be the new innovations happening in microfinance. There are several gaps we want to point out, and one with large importance is credit scoring. There are problems with asymmetric information in microfinance, and lenders exploit this by procuring loans knowing that they might not able to repay them whereas the banks have no payment record or creditworthiness for the borrower. This leads to borrowers taking multiple loans for repaying one loan with another loan which creates a circle of dept. By implementing credit scoring in microfinance, it could resolve the bad loans, which leads to lower defaults. Should credit bureaus be run by the government or by private actors? It is not certainty that this is affordable, or achievable, for the government to implement credit bureaus or profitable for private actors in the microfinance industry. E.g. In countries like Bangladesh, where there is no system of social security numbers or national ID numbers it is difficult to implement credit-scoring systems. Another way to implement credit scoring is domestic cooperating between MFIs or alliances, by sharing development costs of developing, renting or buying a credit scoring system. If new actors start up in the specific country, the new actors can access the credit scoring system by renting from the alliance. Additionally, credit scoring could enhanced repayments rates in microfinance. A possible way for implementation is cooperation between commercial banks that already utilizes

these technological features and microfinance institutions. In this way the commercial bank can show their corporate social responsibility, which are important, as people nowadays are more concerned about image and brand.

### **Responsibility**

Microfinance has the potential of lifting poor people out of poverty and become a well-known concept when Muhammad Yunus received the Nobel Peace Prize in 2006. Microfinance is coming of age, and with its maturation comes the claims that the industry is abandoning its mission to serve the poor. Microfinance has a social responsibility, a mission, to serve the poor, but MFIs have been criticized for become too focused on making profits at the expense of outreach to the poorer customers. Microfinance institutions have ethical challenges when choosing between serving the poor and making profits. Strengthening the responsible management practice for microfinance can result in risk mitigation if MFIs are developed to be sustainable making them keep their social responsibility. This means, not dropping the very poor in favour of the less poor, in order to achieve higher profit as a result of abandoning their current customers. It is not straightforward what action MFIs can do, but the commercial banks can show their corporate social responsibility by helping the MFIs. Commercial banks have the technology microfinance needs to lower their interest rate, and to make it more affordable to take loans from MFIs.