Master Thesis Economics

The effect of competition, regulation and profit orientation on the social and financial performance of microfinance institutions

Marjolein Dilven - s4196546

Master Thesis Economics

Corporate Finance and Control

Supervisor: dr. K. Burzynska

Radboud University Nijmegen - School of Management

Academic Year 2016-2017

Abstract

This study uses a panel of 1490 microfinance institutions from 111 different countries over the period of 2003-2011 to address what effect competition, profit orientation, and regulation have on the social and financial performance of microfinance institutions. For the measurement of competition, the Lerner index and Boone indicator are considered. Moreover is controlled for diverse institution-specific and country-specific variation. The results indicate that competition has a negative effect on the social and financial performance of microfinance institutions (MFIs). Furthermore, it is shown that for-profit and nonprofit MFIs are similar in terms of social performance, but not in terms of financial performance. In addition, when facing competition, for-profit have similar social performance but lower financial performance compared to nonprofit MFIs. Further, regulation has a negative effect on the social performance of MFIs. The effect of regulation on the financial performance shows mixed results, with a lower interest rate and lower costs per dollar loaned. Lastly, under the condition of regulation, for-profit MFIs have a lower social and financial performance compared to nonprofit MFIs.

Table of Contents

1. Introduction

Globally, around 700 million people live in extreme poverty today, down from 900 million in 2012 and even 1.85 billion in 1990 (World Bank, 2016). These are decreasing numbers, nevertheless the number of people living in extreme poverty is still extremely high. One possible way to reduce these numbers is microfinance, which is a way of providing financial services to the poorest of the poor. Studies show that lack of access to financial services not only slows down economic growth, but also results in persistent income inequality due to potentially profitable projects that are not realized (Beck & Demirgüç-Kunt, 2008; Galor & Zeira, 1993). Other studies support these findings, indicating that microfinance reduces poverty in practice for both the borrowers and the local economy (Khandker, 2005). Microfinance has become increasingly popular since the 1970's but came known to the world in 2006, when the Grameen Bank and its founder Muhammad Yunus got awarded the Nobel Peace Prize for his efforts to decrease poverty in Bangladesh.

Microfinance institutions (MFIs) are financial institutions established in different countries all over the world, to provide financial services to people who normally do not have access to it. MFIs are targeting people who are excluded from the formal banking sector (outreach), but at the same time MFIs strive to cover their own costs (sustainability). Outreach, also known as social performance, means that MFIs want to have an impact on their environment and fight against the poverty in the area they operate in. In addition, sustainability can be referred to as financial performance. Financial performance, the ability of MFIs to cover their own expenses and thus be self-sufficient, implies that MFIs should maximize efficiency and productivity so that they have an optimal profitability and can finance their growth.

For the social and financial performance of MFIs, some significant differences arise (Ahlin, Lin, & Maio, 2011). In order to clarify why the differences in MFI performance occur, research has already been done on several indicators. Some studies point towards firm level aspects, such as financial disclosure of MFIs (Quayes & Hasan, 2014), governance in MFIs (Hartarska, 2005; Mersland & Strøm, 2009), group size and social ties (Abbink, Irlenbusch, & Renner, 2006), and female leadership (Strøm, D'Espallier, & Mersland, 2014). Other studies emphasize that country-level aspects cause differences in MFI performance, such as inflation, corruption, inequality (Ahlin et al., 2011), and social beliefs (Burzynska & Berggren, 2015).

Nonetheless, these factors are not able to fully clarify why the differences in MFI performance arise. Another aspect that may contribute to the differences in MFI performance is competition. On the

one hand, general banking literature states that competition leads to lower costs (Stucke, 2013), increasing efficiency (Motta, 2004) and boosts credit availability (Love & Martínez Pería, 2015). On the other hand, it is stated that competition decreases performance if information asymmetry is present (Marquez, 2002). However, the microfinance market acts differently than the general banking sector. MFIs rely more on the relationship with their clients to reduce information asymmetry, since they provide loans without collateral (Assefa, Hermes, & Meesters, 2013). Besides this, competition may decrease MFI interest rate (Fernando, 2006), improves services to MFI clients (Assefa et al., 2013), and improves access to finance (Navajas, Conning, & Gonzalez-Vega, 2003). In addition, clients can take on loans at multiple MFIs and create negative externalities (McIntosh & Wydick, 2005). These negative externalities lead towards lower portfolio quality, which in turn can affect the social and financial performance of MFIs (Vogelgesang, 2003).

The increased competition has attracted the interest of commercial banks and other commercially oriented companies (Hermes, Lensink, & Meesters, 2011). Therefore, the effect of profit orientation on the social and financial performance is studied. The interest of for-profit MFIs may result in a shift from social performance to financial performance, which is called mission drift (Copestake, 2007; Cull & Morduch, 2007). Another explanation for this is that for-profit MFIs may have lower loan prices, which attract increased investment and will eventually lead to a more sustainable social performance (Hermes & Lensink, 2007). Empirical studies, however, show that there is a minimal difference between for-profit and nonprofit MFIs (Mersland & Strøm, 2008; Tchakoute-Tchuigoua, 2010).

In addition, the interaction effect between competition and profit orientation on the social and financial performance of MFIs may lead to some new insights. In theory, competition is associated with efficiency and a reduction in costs (Mayer, 1997), since for-profit MFIs are more sensitive to market pressures (Baquero, Hamadi, & Heinen, 2012). Besides this, for-profit organisations deliver higher quality if competition with nonprofits is the case, due to nonprofit organisations that are superior in terms of quality (Hirth, 1999). Previous empirical findings indicate that nonprofit MFIs reacts less to changes in concentration that take place in the microfinance market (Baquero et al., 2012).

On top of competition and profit orientation, regulation is a factor that could influence the social and financial performance of MFIs (Hartarska & Nadolnyak, 2007). The growth of the microfinance sector caused, besides increased competition and more diversity in the profit orientation, increased call for regulation (Kar, 2016). Regulation mostly arises from market failure, which in turn comes from information asymmetry (Freixas & Rochet, 1997). For the microfinance sector, regulation may lead to a

mission drift (Hartarska & Nadolnyak, 2007). Furthermore, regulation may cause higher risks to be taken on the one hand (Mersland, 2009), but creates a safe environment for the clients on the other hand (Shankar & Asher, 2010). Indirectly, since only regulation MFIs can collect savings, regulated MFIs collect savings from the wealthier clients who bear the fixed costs, and the MFI in turn can loan to the poorer clients (Cull, Demirgüç-Kunt, & Morduch, 2011).

The final relationship this study looks into, is the interaction between regulation and profit orientation. Concerning the social performance, it is argued that mission drift could occur. The mission drift may be due to the focus shifting towards the regulation (Hartarska & Nadolnyak, 2007), or due to for-profit MFIs focusing mostly on generating profits (Copestake, 2007). For financial performance, higher costs might be the case for-profit MFIs due to higher agency costs (Hansmann, 1996). Furthermore, both bear higher costs due higher risks taken (Mersland, 2011) and higher costs for complying with regulation (Christen et al., 2003; Cull et al., 2011). Moreover, for-profit MFIs are attracting wealthier clients (Navajas et al., 2005). These wealthier clients will open deposits at these MFI, resulting in higher investments in MFIs by investors (Hermes & Lensink, 2007).

This study investigates 1490 MFIs from 111 different countries, which make a total of 8726 observations over the period of 2003 to 2011 obtained from the Microfinance Information Exchange (MIX, 2012). With the resulting panel data, this research aims to clarify how competition, regulation and profit orientation influence social and financial performance of MFIs. Besides the regular effect is also looked at the impact on the social and financial performance of the interaction between profit orientation and regulation, and the interaction between profit orientation and competition. Proxies for social performance are number of average borrowers, average loan size and percentage of female borrowers. Proxies used for financial performance are return on assets, portfolio at risk 30 days, interest rate, cost per dollar loaned and cost per borrower. Consequently, control variables are selected based on previous research. Institution-specific controls that will be used are age and size (Al-Azzam, 2016; Cull, Demirgüç-Kunt, & Morduch, 2014; Assefa et al., 2013), taken from the Microfinance Information eXchange (MIX) market database (MIX, 2012). Country-specific controls are real GDP growth (Assefa et al., 2013; Cull et al., 2014) and GDP per capita (Strøm et al., 2014), taken from the World Development Indicators (WDI, 2016).

This study makes several contributions to the literature and empirical field. To start, clarity is brought to the existing debate on competition and the social and financial performance of MFIs. Where other studies are only including for-profit MFIs (as in Assefa et al., 2013), this study also includes nonprofit MFIs to get perspective on the entire microfinance market. The findings indicate that

competition has a negative impact on the social and financial performance of MFIs, in line with other studies (Assefa et al., 2013; McIntosh & Wydick, 2005; Stucke, 2013). Also, the findings are robust for the comparison of the Lerner index and the Boone indicator, which are not considered together before in the literature. Moreover, this study goes deeper into the difference between social and financial performance for nonprofit compared to for-profit MFIs. Mersland and Strøm (2008, 2009) only focus on NGOs and private corporations, where this study broadens the analysis to the entire microfinance sector. This study finds for-profit and nonprofit MFIs are found similar in terms of social and financial performance, where for-profit MFIs charge a slightly higher interest rate. When considering regulation and the social and financial performance of MFIs, the literature on the relationship contradicts one another, calling for further research (Hartarska & Nadolnyak, 2007; Mersland & Strøm, 2009). To clarify on the relationship, this study finds that regulation has a negative effect on the social and financial performance of MFIs.

Besides these main effect, this study takes it one step further and looks into the interaction between profit orientation and competition, and the interaction between profit orientation and regulation. It is one of the first papers to look into this. From the analyses is found, that nonprofit and for-profit MFIs have similar social performance when subject to competition. Considering the financial performance, for-profit MFIs are more sensitive to market pressures, as their financial performance goes down when competition comes into play. Lastly, for-profit MFIs are found to have a decreased social and financial performance compared to non-profit MFIs, where both are subject to regulation.

The remainder of this paper is organised as follows. In section two an overview of the available literature will be provided, as well as the development of the hypotheses. Section three covers the dataset provided by the MIX and research method. Section four discusses the results on the hypotheses testing and robustness tests. Lastly, in section five the conclusion will be drawn, where the results will be summarized. Moreover, in this section the limitations and suggestions for further research will be discussed.

2. Literature Overview

2.1 Competition and social & financial performance of MFIs

Over the last years, an increasing amount of nonprofit and for-profit MFIs have entered the microfinance market. The for-profit MFIs entering the market are particularly attracted by the successful and profitable business model of the established MFIs. In turn, this resulted in a drastic increase in competition in the microfinance sector (Assefa et al., 2013; McIntosh & Wydick, 2005). In the microfinance literature, the increased competition is raising questions about the impact of competition on the social and financial performance of MFIs.

In the beginning MFIs were operating as monopolists in many countries (McIntosh, Janvry, & Sadoulet, 2005). To clarify, a monopoly indicates that there is only one person or corporation offering a particular good (Lerner, 1995). General economic theory states that monopolies lead to welfare losses due to allocative and technical inefficiencies (Leibenstein, 1966), which indicate that there is no optimal allocation of resources for the consumers if there is a monopoly. Profits made in a monopoly rarely go unnoticed, resulting in more companies entering the market that all want some of the profit and are selling similar products (Bresnahan & Reiss, 1990). This happened within the microfinance sector too, where besides the nonprofit MFIs for-profit MFIs entered as well. This caused the monopoly in many countries to fade, leading to increased competition between MFIs.

For the financial market in general, competition leads to better allocative and technical efficiency, the market functions better, the consumer is better protected (Motta, 2004) and the costs for the consumer decrease (Mayer, 1997). This is supported by the market power hypothesis, which states that competition puts a downward pressure on the cost of financing and moreover boosts the availability of credit in general (Love & Martínez Pería, 2015). Applying this to MFIs, the market power hypothesis may point towards a positive relationship between competition and MFI social and financial performance. Opposite to the market power hypothesis, the information hypothesis states that competition can decrease the access to finance, when information asymmetry and agency costs are present. Information asymmetry and agency costs would decrease the incentive to invest in building long-term relationships with the client (Marquez, 2002; Petersen & Rajan, 1995). Applying this to MFIs, the information hypothesis may indicate a negative relationship between competition and social and financial performance.

Nevertheless, there are differences between the general financial market and the microfinance sector. The main problem that banks face is information asymmetry. The information asymmetry problem mostly occurs because the contact between the borrower and lender is difficult, caused by distance or underdeveloped infrastructures (Dalla Pellegrina, 2011). Information asymmetry results in credit rationing, where the borrower would like to borrow more funds but the lenders are not providing more funds or are charging a higher interest rate because of the higher risk (Stiglitz & Weiss, 1981). When the borrowers cannot provide collateral and are poor, information asymmetry further increases and banks are even less likely to lend (Dalla Pellegrina, 2011). In the microfinance market, however, MFIs are particularly based on loans without collateral and moreover rely on good relationships with their clients, to reduce the information asymmetry that arise from such a relationship (Assefa et al., 2013). This may be an indication that MFIs fill the gaps that are uncovered by the banking sector in terms of financing.

To clarify the effect of competition on the social and financial performance of MFIs, it is argued that competition in microfinance leads to better cross-subsidization, lower interest rates, and improved services (Assefa et al., 2013; Kai, 2009; McIntosh & Wydick, 2005). To start off, competition may lead to cross-subsidization. Cross-subsidization means that nonprofit MFIs use the profit from the wealthier clients to subsidize loans to the poorer clients (McIntosh & Wydick, 2005). The argumentation behind cross-subsidization is based on the assumption that the profitability of the clients is affected by their wealth, implying that loans to the wealthier clients are the most profitable and loans to the poorest clients the least profitable. This assumption is supported by the observation that the wealthier clients generally take larger loans, causing MFIs to benefit from economies of scale and thus have lower costs on these loans (Kai, 2009). Nonetheless, increased competition causes a lower cross-subsidization in practice. The poorest clients are more often affected by external shocks, which results in higher default rates (Hisako, 2009). Through the higher default rate, the profit MFIs receive are consequently lower (McIntosh & Wydick, 2005). Moreover, competition in the microfinance sector can provide lower interest rates (Fernando, 2006). General economic theory supports this, arguing that competition leads to a decrease in prices (Stucke, 2013). However, the lower the amount of socially motivated MFIs in the market, the smaller the price decreasing effect on the interest rate (Guha & Chowdhury, 2013). In addition, a lower interest rate is attractive for the wealthy borrower, but in turn it leads to a decline in profitability and cross-subsidization (McIntosh & Wydick, 2005). Lastly, competition can lead to improved services to clients of the MFIs (Assefa et al., 2013) due to for example innovations of MFIs in their core activities (Copestake, 2007).

Besides that, there are studies showing that increasing competition between MFIs may have a negative impact on the microfinance market. To start off, if there is more focus on the cost efficiency of the MFI, there is less focus on the screening of clients. This may result in approval of loans for riskier clients, which in the long term can lead to lower portfolio quality (Vogelgesang, 2003). When more people with a higher default risk are accepted and the quality of the loan portfolio goes down, the MFIs carry the increased default risk of their clients. Another argument to consider is the dynamic incentives provided to the MFI clients, which do not function well in an environment of competition. Dynamic incentives imply that clients can only get future loans when they pay back their original loans (Hisako, 2009). If competition increases and the clients have access to future loans at other MFIs, the repayment rates would fall, resulting in an increased default rate. This theory is supported by empirical studies, starting with the fact that competition makes it more difficult to share information (Broecker, 1990; Marquez, 2002). The increased information asymmetry between MFIs on the clients incentivizes borrowers to take on multiple loans, and consequently increases the total debt outstanding (McIntosh & Wydick, 2005). The multiple loan taking leads to increased indebtedness, and consequently to a decreased repayment rate (McIntosh et al., 2005; Vogelgesang, 2003). Decreased repayment rates lead to a lower efficiency of the MFI, which may result in a lower financial performance since less loan repayment is received. Another result of the multiple loan taking is the need for more intensive monitoring of the clients by the personnel, which increases the costs (McIntosh & Wydick, 2005). Moreover, it may lead to a lower outreach, since there is less money available to finance the poorer clients. Lastly, when competition increases, the interest-rate declines (Hermes et al., 2011). While a lower interest rate makes the richer borrowers better off, it may result in less cross-subsidies due to lower profits (Hisako, 2009).

Theory thus shows that competition in the microfinance market may lead to better cross-subsidization, lower interest rates and improved services. However, in practice, these arguments do not hold. Empirical studies find that competition in microfinance causes the portfolio quality to go down, provides the incentive to take on multiple loans, decreases the dynamic incentive, causes a drop in interest rates and may consequently cause less financial and social performance. Following the discussed literature and previous empirical studies on competition and the social and financial performance of MFIs, the following hypothesis is proposed:

Hypothesis 1: Competition has a negative effect on the social and financial performance of MFIs.

2.2 Profit orientation and social & financial performance of MFIs

Initially, MFIs were nonprofit organisations that mostly depend on capital from others, for instance donors or the government (Baquero et al., 2012). However, the rapid growth of the microfinance sector and increased competition in the sector, together with the realisation that the market was profitable, has attracted for-profit institutions into the microfinance market (McIntosh & Wydick, 2005). To clarify, in nonprofit MFIs there are no owners that can legally claim ownership or earnings from the MFI (Mersland, 2009). Moreover, the MFI is accountable for the fulfilment of their mission, which will be monitored by the various stakeholders such as donors (Mersland, 2011). In contrast, for-profit MFIs are shareholder owned, where the shareholders control the management decisions and have ownership rights that can be transferred in the market (Tchakoute-Tchuigoua, 2010). The current debate around the profit orientation of MFIs focuses mainly on the question whether for-profit MFIs are better at addressing the social and financial goals, when compared to nonprofit MFIs (Mersland & Strøm, 2009). Since the growth in for-profit MFIs may lead to a shift from the focus on social performance to a focus towards financial performance (Cull & Morduch, 2007).

In general, research about the effect of profit orientation on firm performance roots in the agency theory. Agency theory states that the separation of ownership and control within a firm result in agency costs, which can be most effectively reduced by providing monetary incentives (Jensen & Meckling, 1976). Agency costs may be higher in nonprofit organisations without owners due to lower monetary incentives provided to the management, which offers less incentive to align the interests of stakeholders and the organisation. Consequently, agency costs will be lower for for-profit organisations with owners, due to the higher monetary incentives provided and the shareholders controlling the management decisions (Mersland & Strøm, 2008). However, agency theory argues that nonprofit organisations may be more effective in the reduction of adverse selection and moral hazard problems, since the relationship of nonprofit organisations with their clients is closer (Hansmann, 1996). This effect may be even stronger for the microfinance market, as MFIs rely more on the information provided by the client, resulting in a high importance of the relationship between the MFI and the clients (Assefa et al., 2013). Therefore, agency costs may be lower for nonprofit MFIs.

For MFIs specifically can be argued that for-profit organisations will have improved efficiency, since they focus more on the market in terms of commercialising (Roberts, 2013). Especially, deciding between for-profit and nonprofit MFIs, wealthier clients choose the for-profit MFI in order to ask for bigger loans (Navajas et al., 2003). Consequently, for-profit MFIs will have lower loan prices due to resulting economies of scale (Morduch, 2000). The lower loan prices of for-profit MFIs will result in

the attraction of increased investment, and may furthermore make the social impact of the MFIs more sustainable (Hermes & Lensink, 2007). However, for-profit MFIs are not only charging higher interest rates but also have higher costs, indicating that the benefits that for-profit organisations are supposed to have in terms of the market orientation and business thinking do not hold (Roberts, 2013). Furthermore, for-profit MFIs may focus more on making a profit, resulting in the shift away from the social goals of serving the poor clients and poverty reduction in general. With respect to the latter case, the concern arises that the for-profit MFIs will no longer serve the poorest clients because they are focusing on generating profit - this is referred to as mission drift (Copestake, 2007). Alternatively, empirical studies showed that for-profit and nonprofit MFIs are similar in terms of social and financial performance (Mersland & Strøm, 2008, 2009; Tchakoute-Tchuigoua, 2010). One aspect these empirical studies do not take into account is interest rate. In addition, stronger profit orientation indicate that higher interest rates are charged (Roberts, 2013).

The theoretical consideration regarding the effect of regulation and the social and financial performance are mixed, indicating that the relationship is not clear-cut. However, when looking at empirical studies it can be expected that for-profit and nonprofit MFIs are similar in terms of social and financial performance. Therefore, the empirical results regarding profit orientation and the social and financial performance of MFIs are taken into consideration for the hypothesis. The following hypothesis is conducted:

Hypothesis 2: For-profit and nonprofit MFIs are similar in terms of social and financial performance.

2.2.1 Profit orientation, competition and social & financial performance in MFIs

Ever since the microfinance sector became more developed, the already established nonprofit MFIs were confronted with an increase in competition and for-profit MFIs entering the market (Assefa et al., 2013). In contrast with nonprofit MFIs, for-profit MFIs are more commercially oriented and generally have higher efficiency (Roberts, 2013). In addition, for-profit MFIs have lower loan prices (Morduch, 2000), which causes wealthier clients to choose for for-profit MFIs if available (Navajas et al., 2003). Therefore, when put in an environment of competition, the effect on the social and financial performance of nonprofit MFIs compared to for-profit MFIs may be different (Baquero et al., 2012).

When looking at the product market in general, competition is associated with efficiency and a reduction in costs (Mayer, 1997). For the general literature concerning this relationship, theory states that for-profit organisations deliver higher quality whenever they are experiencing competition from nonprofit organisations. The nonprofit organisations deliver high quality, therefore, clients do not go to

the low-quality for-profit organisations and consequently the number of low-quality for-profits organisations is reduced (Hirth, 1999). In practice, for-profit organisations deliver higher quality if the share of nonprofit organisations in the market grows and the overall quality in the market increases (Grabowski & Hirth, 2003; Santerre & Vernon, 2005). In turn, the presence of for-profit organisations leads to an increasing efficiency of the nonprofit organisations (Santerre & Vernon, 2005). This may indicate that a mix of for-profit and nonprofit organisations in the market is optimal.

There are few studies in the microfinance field that research the effect from competition and profit orientation on the social and financial performance of MFIs. These studies argue that for-profit MFIs are more sensitive to competitive pressures compared to nonprofit MFIs (Baquero et al., 2012; Navajas et al., 2003). Clients of for-profit MFIs have low switching costs that make for-profit MFIs lose their benefits. In turn, there is a benefit for the nonprofit MFIs that have a great number of clients when high switching costs are the case. Their benefit will come from the information monopoly on their clients, which makes them additionally more effective when screening new clients. However, this information monopoly can disappear again if competition increases and switching costs decrease (Baquero et al., 2012). In addition, empirical findings show that when the nonprofit MFI is already existing and a for-profit MFI enters the market, wealthier clients shift from the nonprofit MFI to the for-profit MFI to ask for larger loans. Wealthier clients shifting to for-profit MFIs, in turn, worsen the portfolio of the nonprofit MFI, leading them to become less profitable and less able to cross-subsidize. This might indicate that for-profit MFIs have a higher social performance than nonprofit MFIs when facing competition, since they can accommodate more and poorer clients due to the cross subsidizing. Moreover, when for-profit MFIs enter the market where nonprofit MFIs are already operating, they go different about the screening of the clients. The nonprofit MFI prefers a personalized screening per client, resulting in higher costs. The for-profit MFI prefers a standardized screening that is adjustable to the needs of their clients, to be more profitable (Navajas et al., 2003). This results in for-profit MFIs charging lower interest rates and having improved portfolio at risk under competition, while nonprofit MFIs are less responsive to changes in competition (Baquero et al., 2012). This may suggest that for-profit MFIs have an improved financial performance compared to nonprofit MFIs when facing competition.

Literature states that when competition is the case, competitive advantage of nonprofit decreases. Moreover, when for-profit MFIs are entering the market where nonprofit MFIs are already active, clients shift to towards the for-profit MFI. Therefore, they can accommodate more and poorer clients due to the cross-subsidizing. In terms of social performance is expected that when facing competition, for-profit MFIs have more social performance than nonprofit MFIs. For financial

performance, is noted that nonprofit MFIs have a more costly screening approach compared to the standardized approach for-profit MFIs. Additionally, empirical evidence shows that for-profit MFIs charge lower interest rates and have improved portfolio at risk when facing competition. On the contrary, nonprofit MFIs are less responsive to changes in competition. Consequently, hypothesis 3 is formulated:

Hypothesis 3: When facing high competition, for-profit MFIs have more positive social and financial performance than nonprofit MFIs.

2.3 Regulation and social & financial performance of MFIs

Next to the higher competition and entrance of for-profit MFIs, the growth of the microfinance sector cause an increased call for regulation (Cull et al., 2011). The basic goal of regulation is to protect the general financial system, and especially small depositors against the risks associated in the market (Dijck, Nusselder, & Sanders, 2004). One of the most prominent regulations in the microfinance sector are interest rate controls, where MFIs can charge no more than the maximum interest rate (Olsen, 2010). One other important impact of regulation in the microfinance sector, is that only regulated MFIs are allowed to accept deposits. The regulation of deposit-taking MFIs is legitimate, since clients are small, widely distributed, mostly uneducated and do not have the means to monitor management (Hartarska & Nadolnyak, 2007).

When looking at the banking sector in general, regulation comes up as a policy instrument when market failure occurs. Market failure mainly comes from information asymmetry, but can also come from market power or negative externalities, such as bank runs (Freixas & Rochet, 1997). The theory behind this is called the public interest approach, and is the main reason for regulating financial institutions (Barth, Caprio, & Levine, 2008). The public interest approach also argues that regulation acts more efficiently on behalf of the clients of the bank and consequently protects them (Dewatripont & Tirole, 1994). Opposite to the public interest theory is the public choice theory. The public choice theory states that regulation is inefficient, creating barriers of entry and higher profits for the established institutions (Djankov, La Porta, Lopez-de-Silanes, & Shleifer, 2002). In addition, a moral hazard problem occurs, indicating that banks show riskier behaviour when they know regulation is in place (Macy and O'Hara, 2003). This may have a reverse effect on the firm performance.

For the microfinance sector in particular, it is argued that regulation may have a negative effect on the social and financial performance of MFIs. Firstly, regulation may lead to a mission drift. The mission drift would occur, if the requirements that regulation puts on MFIs shift the focus away from serving the poorest clients (Hartarska & Nadolnyak, 2007). Secondly, it is more challenging for MFIs to

report about their financial position compared to banks, since they have clients with smaller portfolios and MFIs consequently have more and smaller transactions (Christen et al., 2003). This implies higher costs have to be kept in mind, which can be compensated by the MFIs charging a higher interest rate or taking larger loan sizes for example (Cull et al., 2011). Besides that, when MFIs know the deposits are guaranteed by the government, higher risks will be taken (Mersland, 2009). Higher risks may have a counterproductive effect on the financial performance of MFIs, since they often result in higher costs. Additionally, the cost of complying with regulation is up to 12 percent in the banking sector, and it would consequently be higher for MFIs (Christen et al., 2003; Cull et al., 2011). At the same time, however, MFIs might have more opportunity to build and operate when no regulation is involved (Christen & Rosenberg, 2000). MFIs benefited from non-involvement from the government at the start of the microfinance market. Nevertheless, deposit-taking MFIs had to be regulated later on, since many clients lost their savings due to inability and inexperience of unregulated MFIs (Wright, 2000). Regulation is from this point of view a necessity, to protect the clients of MFIs.

Besides the possible negative impact of regulation on the social and financial performance of MFIs, there is an indirect effect that could occur. Indirectly regulation may lead to better outreach, since collecting savings can contribute to an improved outreach. Most of the savings in MFIs come from wealthier clients, who bear the fixed costs. The MFIs in turn can provide savings for the poorer clients with the earnings from the wealthier clients (Cull et al., 2011; Richardson, 2003). Moreover, regulation can contribute to a safe environment for all clients, where they can protect their savings, manage risk more efficiently and provide assurance for clients with new products (Shankar & Asher, 2010).

The empirical findings regarding this relationship are mixed. Some studies suggest that regulation of MFIs leads to less lending to women, lower profitability (Cull et al., 2011) and lower return on assets (Hartarska, 2005). While other studies find that regulation does not directly affect social nor financial performance of MFIs (Hartarska & Nadolnyak, 2007; Mersland & Strøm, 2009). However, there is evidence for the indirect argumentation where MFIs accepting savings have a better social performance (Hartarska & Nadolnyak, 2007). Besides that, MFIs with more regular supervision are, despite the higher costs, not less profitable (Cull et al., 2011). A local study done by Lafourcade, Isern, Mwangi and Brown (2005) indicates that in Africa unregulated MFIs on average have lower number of loans and savings accounts. Nonetheless, unregulated MFIs are reaching the poorer clients. Moreover, they find that regulated MFIs achieve higher efficiency, indicated by lower costs per borrower and saver, and are in general more productive, indicated by more borrowers and savers per staff member.

Since the empirical findings regarding the relationship between regulation and social and financial performance of MFIs are mixed, the hypothesis will be derived based mostly on the theoretical considerations. For the effect of regulation on social performance of MFIs, the indirect effect is taken into account, where collecting savings may contribute to an improved outreach. Therefore, the social performance is expected to increase due to regulation, since wealthier clients will take on the fixed costs and extra poor borrowers can be reached in this way. Regarding regulation and financial performance of MFIs, higher costs have to be kept in mind when having to comply with regulations. This might have an adverse effect on the regulation of MFIs. With respect to the literature, the following hypotheses will be formulated:

Hypothesis 4a: Regulation has a positive effect on the social performance of MFIs.

Hypothesis 4b: Regulation has a negative effect on the financial performance of MFIs.

2.3.1 Regulation, profit orientation and social & financial performance in MFIs

Since the microfinance sector further developed, call for regulation increased with the number of for-profit MFIs. According to previous studies, for-profit MFIs have wealthier clients that ask for bigger loans (Navajas et al., 2003) and improved efficiency (Roberts, 2013). Moreover, for-profit MFIs have economies of scale due to the bigger loans provided to their clients, which will attract more investment and make for-profit MFIs more sustainable (Hermes & Lensink, 2007) In addition, since for-profit MFIs have different incentives than nonprofit MFIs, regulation may have a different effect on for-profit versus nonprofit MFIs (Cull et al., 2011). Therefore, in this section, the effect of regulation and profit orientation on the social and financial performance will be discussed. This study is one of the first in the microfinance field to look at this interaction.

When looking at regulation, there is argued that a mission drift could occur if the MFIs focus goes from serving the poorer clients towards complying with the regulation (Hartarska & Nadolnyak, 2007). This effect can be reinforced by profit orientation, where mission drift occurs if the for-profit MFIs focus on generating profit and no longer on the serving of the poorest clients (Copestake, 2007). This means when for-profit MFIs are subject to regulation, the focus on serving the poorest clients may be lower. Therefore, may be expected that for-profit MFIs, which are subject to regulation, have a lower social performance than nonprofit MFIs that are subject to regulation.

For financial performance, agency theory states that costs might be higher for for-profit MFIs. Nonprofit MFIs can better reduce the adverse selection and moral hazard issues, since their

relationship with the client is closer (Hansmann, 1996). Nevertheless, agency costs might be higher for nonprofit MFIs, because the monetary incentive to align the interest of the stakeholder and the organisation may be too low (Mersland & Strøm, 2008). Besides that, higher risks may be taken when is known to the MFI that their deposits are guaranteed (Mersland, 2011). Higher risks may in turn result in higher costs, on top of the costs of complying regulation for both for-profit MFIs and nonprofit MFIs (Christen et al., 2003; Cull et al., 2011). However, empirical findings suggest that MFIs with more regular supervision are, despite the higher costs, not less profitable (Cull et al., 2011). In addition, regulated MFIs are the only ones that can take deposits, which will in general attract wealthier clients that have enough funds to open deposits (Hartarska, & Nadolnyak, 2007). Moreover, for-profit MFIs are preferred over nonprofit MFIs by wealthier clients, since they can ask for bigger loans in for-profit MFIs (Navajas et al., 2003). Wealthier clients are the ones that will mainly deposit at MFIs, since they have the funds to do so, consequently for-profit MFIs will attract higher investment (Hermes & Lensink, 2007). The higher investment might in turn lead to a higher financial performance

Literature on the interaction between profit orientation and regulation on social and financial performance of MFIs, indicate a negative relationship. Since no empirical evidence is available on the social performance, the hypothesis will be derived based on the theory. For financial performance, there are contradicting arguments that can be made. Concerning the agency theory and costs of complying with regulation, this is not supported by empirical research. Therefore, the argumentation that for-profit MFIs are preferred over non-profit MFIs by the wealthier clients is taken into account. Thus, based on the literature, the following hypotheses will be formulated:

Hypothesis 5a: When subject to regulation, for-profit MFIs have a lower social performance than nonprofit MFIs.

Hypothesis 5b: When subject to regulation, for-profit MFIs have a higher financial performance than nonprofit MFIs.

3. Methodological approach;

3.1 Research Sample

The data on MFI performance is extracted from the MIX Market database (MIX, 2012), which contains data on around 1700 MFIs from over 100 different countries. The database is widely used for research on the microfinance sector (Assefa et al., 2011; Kar, 2016; Vanroose & D'Espallier, 2013). The focus of this study will be on the period from 2003 to 2011, due to data availability. In addition, a panel analysis will be executed to analyse the data. Moreover, no geographical limitations will be put on the data, since MFIs are mostly active in developing countries.

Furthermore, it should be noted that the data in the MIX Market database is self-reported, which may have consequences for the reliability of this study. The data is ranked in order of quality from 1 to 5 diamonds, where 1 diamond is the worst and 5 diamonds is the best data quality. In order to maintain the validity of the data high, this study only focuses on data with the quality of 3 diamonds and higher (as in Quayes, 2012; Kar, 2016; Lafourcade et al., 2005). The 3 diamonds and higher data quality includes at least general, outreach and financial data for the minimum of two consecutive years (3 diamonds), as well as audited statements where they are provided (4 or 5 diamonds). The selection results in 1490 MFIs from 111 different countries, a total of 8726 observations over time. The countries are divided into the next six regions: Africa (Africa), East Asia and the Pacific (EAP), Eastern Europe and Central Asia (EECA), Latin America and the Caribbean (LAC), Middle East and North Africa (MENA) and South Asia (SA).

Table 1 provides an overview of the sample descriptive statistics. Panel A shows the data divided into the six different regions per year, where Latin America and the Caribbean is the biggest region with 28.3% of the observations and Middle East and North Africa the smallest with 5.2% Panel B shows the comparison between regulated and unregulated MFIs per year, where 37.9% of the sample is unregulated and 62.1% of the sample is regulated. Panel C shows the profit orientation per year, where 59.3% of the observations are nonprofit MFIs and 40.7% of the observations are for-profit MFIs.

Table 1 – Sample Descriptive Statistics

Panel A: Year Observations per Region

Year	Africa	EAP	EECA	LAC	MENA	SA	Total
2003	86	52	105	126	29	86	484
2004	105	75	128	171	35	120	634
2005	129	86	153	214	38	143	763
2006	135	101	168	240	44	153	841
2007	158	115	197	284	54	165	973
2008	189	122	216	328	63	199	1,117
2009	255	159	232	357	67	234	1,304
2010	266	176	242	381	67	248	1,380
2011	220	162	200	368	57	223	1,230
Total	1,543	1,048	1,641	2,469	454	1,571	8,726

Panel B: Regulation per Year

Year	Unregulated	Regulated	Total
2003	160	324	484
2004	230	403	633
2005	291	469	760
2006	324	513	837
2007	385	583	968
2008	433	669	1,102
2009	467	772	1,239
2010	485	807	1,292
2011	435	718	1,153
Total	3,210	5,258	8,468

Panel C: Profit Orientation per Year

Year	Non-Profit	Profit	Total
2003	299	184	483
2004	397	234	631
2005	475	284	759
2006	508	329	837
2007	584	380	964
2008	652	444	1,096
2009	708	534	1,242
2010	740	557	1,297
2011	661	497	1,158
Total	5,024	3,443	8,467

3.2 Measurement of Variables

3.2.1 Dependent Variables

The dependent variables in this study are the social and financial performance of MFIs. Social performance of MFIs relates to the degree of outreach. To measure social performance, certain proxies are employed. Schreiner (2002) finds that social performance of MFIs can among others be accessed through breadth and depth of outreach. The breadth of outreach is measured by the number of clients

making use of the MFIs services, also referred to as number of active borrowers (Ferro-Luzzi & Weber, 2006; Mersland & Strøm, 2009). To normalize the number of average borrowers, the variable is transformed to logarithmic form. The depth of outreach is defined as the value that is attached by society to the net gain of a given client (Schreiner, 2002). This is measured by the average loan size (Cull & Morduch, 2007; Louis, Seret, & Baesens, 2013; Mersland & Strøm, 2009) and by using the percentage of female borrowers (Bassem, 2012; Cull & Morduch, 2007). Average loan size will be measured calculating the average loan balance as a percentage of gross national income (GNI) per capita (Roberts, 2013). For this study, the proxies used for social performance of MFIs are the number of active borrowers, average loan size and percentage of female borrowers.

Financial performance of MFIs relates to sustainability. Sustainability can be formulated as efficiency and productivity, or the ability of MFIs to be self-sufficient. The best way to measure efficiency and productivity is by the return on equity (ROE) and return on asset (ROA) (Ayayi & Sene, 2010; Bassem, 2012; Strøm et al., 2014). The ROA is a general measure that measures the profitability of any firm, which can be especially useful since this enables to compare profit to nonprofit MFIs. However, the ROE is a less appropriate measure when measuring across different institutions, since the debt to equity levels might differ significantly between profit and nonprofit MFIs (Mersland & Strøm, 2009). Therefore, the measure used will be the ROA. Another driver of MFI financial performance is portfolio at risk (PAR) (Assefa et al., 2013). This measure indicates what part of the loan portfolio is overdue, where 30 days is the most common to use (Lafourcade et al., 2005). Furthermore, the interest rate is an indicator of the financial performance of MFIs (Ayayi & Sene, 2010; Cull & Morduch, 2007). Since this is not directly included in the MIX Market data, the interest rate (IR) will be measured taking the real gross loan portfolio yield. The interest rate will not only reflect the interest rate charged by the MFIs, but also the additional fees that have been charged to the lender (Cull & Morduch, 2007). Other drivers of financial performance mainly include cost per dollar loaned and cost per borrower (Ahlin et al., 2010), where cost per dollar loaned will be measured dividing operating expense by the average size of the loan portfolio. For this study the proxies used for financial performance of MFIs are return on assets, portfolio at risk 30 days, interest rate, cost per dollar loaned and cost per borrower.

3.2.2 Independent Variables

3.2.2.1 Measurement of Competition

The measurement of competition can be done in an indirect or direct way. Direct ways of measuring competition are often challenging due to data unavailability on for example costs and prices (Van Leuvensteijn, Bikker, van Rixtel, & Sørensen, 2011). Therefore, in banking and in microfinance literature, indirect measures of competition have been used. Vogelgesang (2003) uses the number of clients that have a loan at another MFI, McIntosh, Janvry, and Sadoulet (2005) look at the presence, number and proximity of the closest competitor, Hartarska and Nadolnyak (2007) take the number of MFIs per country, Mersland and Strøm (2012) use the Panzar-Rosse model, Baquero et al. (2012) use the Herfindahl-Hirschman index to compute the yearly competition, Assefa et al. (2013) use the Lerner index and Kar (2016) takes the Boone indicator.

In the banking literature, the measures that are used can be classified into two groups; the structural approach and the non-structural approach. The structure approach wants to test market structure and uses indirect ways of measuring competition, following the structure-conduct-performance (SCP) hypothesis. The SCP hypothesis argues that market structure determines the firm conduct, and this in turn determines the firm's performance. Due to this a higher market concentration leads to a lower cost of collusion, and therefore the profits for all firms are higher (Berger, 1995). This approach is measuring the market structure, like concentration, number of banks or Herfindahl-Hirschman index. Opposite to this view is the non-structural approach that uses direct ways of measuring competition, following the efficient structure (ES) hypothesis. The ES hypothesis states that some firms are more efficient than others, which results in higher profits, larger market shares. Consequently the larger market shares leads to high levels of market concentration due to the attraction of newcomers (Berger, 1995). Classified in this group is the Panzar-Rosse model used by Mersland and Strøm (2012), the Lerner index used by Assefa et al. (2013) and the Boone indicator used by Kar (2016).

However, it is highlighted that market structure measures are poor measures of competition (Claessens & Laeven, 2004). Therefore, measures used by Vogelgesang (2003), McIntosh et al. (2005), Hartarska and Nadolnyak (2007) and Baquero et al. (2012) are less reliable indicators of competition. In addition, for the Panzar-Rosse model the essential assumption for a long-run equilibrium does not hold in the microfinance sector (Mersland & Strøm, 2012). Moreover, the Boone indicator of Kar (2016) can only be calculated average per year or average per country, which would cause a distorted image when including this in the regression analysis. Therefore, the Lerner index used in Assefa et al. (2013) will be

used as measure for competition in the microfinance sector. The Boone indicator will be used for testing the robustness of the Lerner index later on.

The Lerner index measures the market power of an institution, as in Assefa et al. (2013). This is calculated with L = (p-MC)/p, where p is output price and MC is total marginal cost. The p will be measured using the yield on the gross loan portfolio. The marginal cost function will be calculated using the following translog cost function:

$$\ln C_{it} = \alpha_{it} + \alpha_1 lny_{it} + \frac{1}{2}\alpha_2 (lny_{it})^2 + \sum_{j=1}^{2} \beta_j \ln w_{jit} + \sum_{j=1}^{2} \beta_j (\ln w_{jit})^2 + \sum_{j=1}^{2} \gamma_j ln\, y_j ln\, w_{jit} + \sum_{j<k} \sum \gamma_{jk} ln\, w_{jit} ln\, w_{kit} + \delta_1 \ln(assets) + \delta_2 PAR30 + \sum_{j=1}^{2} \gamma_j ln\, y_j ln\, w_{jit} + \sum_{j<k} \sum \gamma_{jk} ln\, w_{jit} ln\, w_{kit} + \delta_1 trend + \delta_2 trend^2 + \delta_3 ln\, y_{it} trend + \sum_{j=1}^{2} \eta_j\, log\, w_{jit} trend + \varepsilon_{it}$$

where C_{it} is the total cost of MFI i at year t, y represents the output, and w_j reflects the input prices (labor and capital). The specification will be done following Assefa et al. (2013). The output (y) will be measured using the gross loan portfolio. Total costs (C) is considered to consist of financial and operating costs of MFIs. Besides that, the inputs considered relevant are labour and capital. The cost of labour is the ratio of operational expenses to the number of employees and the cost of capital is financial expenses to total liabilities. Moreover, the log of total assets is included to capture the size whereas the portfolio at risk looks at the difference in risk taking. Lastly, time dummy variables are included to capture the possible technological effect occurring.

When taking the derivative of this function with respect to *ln y*, the marginal cost function is obtained:

$$MC_{it} = \left(\frac{C_{it}}{y_{it}}\right)(\alpha_1 + \alpha_2 lny_{it} + \sum_{j=1}^{2} \gamma_j ln\, w_{jit})$$

The value of the Lerner index ranges between 0 and 1, where a Lerner value of 0 implies a perfect competitive market and the value close to 1 implies a monopolistic market (De Guevara, Maudos, & Pérez, 2005). This means that a decreasing value of the Lerner index implies a rise in competition. In order to avoid any confusing when performing the analyses on the panel data, the measure of competition will be calculated as 1 minus the Lerner index. In this way, a higher number means a higher level of competition.

3.2.2.2 Measurement of Regulation

Regulation is measured by a proxy that can be yes or no, depending on whether the MFI has to comply with some form of regulatory authority. Regulation most often applies to MFIs that are 'Banks' or 'Non-Bank Financial Institutions (NBFIs)'. However, it can also be applicable to 'Credit Union / Cooperatives' or 'Non-Governmental Organisations (NGOs)' in some cases (MIX Glossary, 2017). In order to measure regulation a dummy variable is created, which will be 1 if the MFI is regulated and 0 if the MFI is not regulated.

3.2.2.3 Measurement of Profit Orientation

Profit orientation is referred to as either for-profit or nonprofit, this will be measured using the available information from the MIX Market database. Consequently, a dummy will be created for this variable which will be 1 if it is a for-profit MFI and 0 if it is a nonprofit MFI.

3.2.3 Control Variables

In this study, there will be several institution-specific controls, which are controls that are determined by characteristics of the institution and may have an influence on the social and financial performance of MFIs. In this study will be controlled for age and size (Al-Azzam, 2016; Cull, Demirgüç-Kunt, & Morduch, 2014; Assefa et al., 2013). Age will be captured as a proxy variable for either new, young or mature, which is compliant with the MIX Market classification. When the MFI is classified as a new, young or mature this means the MFI is respectively between 1-4 years, 5-8 years or more than 8 years old. Age gets a value of 1 if the MFI is new, a value of 2 if the MFI is young and a value of 3 if the MFI is mature. Size will be measured by taking the natural logarithm of total assets, in order to reduce outlier bias (Strøm et al., 2014).

Besides the MFI-specific control, there is controlled for several country-level characteristics. These country-level characteristics include real GDP growth (Assefa et al., 2013; Cull et al., 2014) and GDP per capita (Strøm et al., 2014). These country-level control variables will be taken from the World Development Indicators (WDI) (World Bank, 2017). In addition, region dummies are created for every MFI. This will be done by making dummy variables for Africa (Africa), East Asia and the Pacific (EAP), Eastern Europe and Central Asia (EECA), Latin America and the Caribbean (LAC), Middle East and North Africa (MENA) and South Asia (SA).

Table 2 shows the proxies and measurement of the dependent, independent and control variables that are used in this study.

Table 2 – Explanation of Variables

Variable	Proxy	Measurement
Dependent Variables		
LNAB	Log of Number of Active Borrowers	Log of Number of individuals that have a loan outstanding
AVLOAN	Average Loan Size	Average loan balance per borrower as percentage of gross national income per capita
FEMALE	Percentage of Female Borrowers	Women active borrowers as percentage of total active borrowers
ROA	Return on assets	Net Income to total assets
PAR30	Portfolio At Risk 30 days	
IR	Interest Rate	Real gross portfolio yield
COSTUSD	Cost per Dollar Loaned	Operating expenses divided by size of loan portfolio
COSTBOR	Cost per Borrower	Operating expenses divided by number of active borrowers
Independent Variables		
COMP	Competition	1 - Lerner index
REG	Regulation	Dummy that equals 1 when the MFI is regulated and 0 if the MFI is unregulated
PROFOR	Profit Orientation	Dummy that equals 1 when the MFI is for-profit and 0 if the MFI is nonprofit
Control Variables		
AGE	Firm Age	Dummy is created stating if a MFI is new (1), young (2) or mature (3)
SIZE	Firm Size	Natural logarithm of total assets
RGDPGWTH	Real GDP Growth	
GDPCAP	GDP per capita	

3.3 Empirical Model

The estimated regression equation take the following form:

$$Y_{ijt} = \beta_0 + \beta_1 COMP_{jt} + \beta_2 PROFOR_{jt} + \beta_3 REG_{jt} + \beta_4 COMP_{jt} * PROFOR_{jt} + \beta_5 REG_{jt} * PROFOR_{jt} + \beta_6 X_{jt} + \varepsilon$$

where Y_{ijt} is the financial and social performance for MFI i in country j at time t, $COMP_{jt}$ represents the competition, $PROFOR_{jt}$ is the profit orientation, REG_{jt} is the regulation, $COMP_{jt} * PROFOR_{jt}$ represents the interaction effect between competition and profit orientation, $REG_{jt} * PROFOR_{jt}$ is the interaction effect between regulation and profit orienation, X_{jt} captures the control variables and ε represents the error term.

4. Analysis

4.1 Descriptive Statistics

The sample is retrieved from the MIX Market database (2012) and consists of 8726 observations between the years 2003 and 2011. Table 3 shows the descriptive statistics of the variables that are used in this study.

Looking at the descriptive statistics, it is noticed that quite some standard deviations are bigger compared to the mean. A standard deviation that is bigger than the mean indicates data that is spread out, which may be an indication of outliers or influential cases than distort regression outcomes. To determine whether the outliers are influential cases, the Cook's D will be calculated for all dependent variables. For the number of average borrowers, percentage of female borrowers, portfolio at risk 30 days and interest rate, the Cook's D value is not higher than $4/\sqrt{n}$. This are also the variables for which the standard deviation is smaller than the mean. For the variables average loan size, return on assets, cost per dollar loaned and cost per borrowers, there are some observations with a Cook's D values higher than $4/\sqrt{n}$. When looking at those variables, is noticed that these are the variables for which the standard deviation is bigger than the mean. The Cook's D values will be discussed next.

For average loan size, there are three values larger than $4/\sqrt{n}$. These observations have the values of 30.6648, 33.9264 and 31.8915 average loan size. When comparing this with the mean of 0.7079198, those values can be classified as outliers. Removing those values from the analysis result in a slightly decreased R-squared and no change in variables. Therefore, the values will be kept in the analysis, since they are outliers and no influential cases. When doing the same for the values of return on assets and cost per dollar loaned, the R-squared is not influenced and neither are the variables. Consequently, these values will also be kept in the analysis. The Cook's D is also calculated for cost per borrower, where three observations are larger than $4/\sqrt{n}$. These observations have the values of 9250, 12185 and 15151, compared with a mean of 207. The results when removing the observation with the largest Cook's D, 12185 cost per borrower, do not change significantly. The adjusted R-squared of all analyses slightly decrease or stay the same, and the variables do not change. When removing any of the other observations of cost per borrower with a large Cook's D, the results do not change. These observations are thus no influential cases and will therefore be kept in the analysis.

When comparing the descriptive statistics to other studies the data looks similar, as far as the same measurements and variables are used (Assefa et al., 2013; Burzynska & Berggren, 2015; Cull et al., 2014; Tchakoute-Tchuigoua, 2010).

Table 3 – Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Dependent Variables					
LNAB	8,726	9.008878	1.959861	.6931472	15.91552
AVLOAN	8,103	.7079198	1.891234	0	54.4327
FEMALE	6,701	.6610029	.2694341	0	1
ROA	6,982	.0095368	.1173038	-2.1367	.7986
PAR30	6,885	.0643074	.1037997	0	1
IR	6,242	.2443388	.1750812	-.2467	1.2962
COSTUSD	6,967	.2803167	.4318431	0	17.3816
COSTBOR	6,619	210.3084	491.5207	0	15151
Independent Variables					
COMP	5,725	.1166316	.0681632	.0136966	.9914708
REG	8,468	.6209258	.4851853	0	1
PROFOR	8,467	.4066375	.4912351	0	1
COMPPROFOR	5,631	.0469652	.0681741	0	.8260815
REGPROFOR	8,362	.3416647	.4742961	0	1
Control Variables					
AGE	8,467	2.452226	.770455	1	3
SIZE	8,380	15.51045	2.003335	0	24.18653
GDPGWTH	8,712	5.609758	4.003099	-14.8	54.15778
GDPCAP	8,714	2816.179	2794.83	112.8494	14705.69

4.2 Specification Tests

Possible biases in the model have to be prevented, by checking heteroskedasticity, outliers, multicollinearity and autocorrelation. The data obtained from the MIX Market database contains panel data. For panel data, three different types of analysis can be conducted; the fixed effects, the random effects or the pooled effects model. The Hausman test will be conducted in order to choose between the fixed effect and the random effect model. In addition, the Breusch-Pagan Lagrange Multiplier test is done to check whether the pooled or the random effects model is more suitable.

To start, multicollinearity is checked. Multicollinearity can arise if variables correlate, which could influence the results. One way to check whether there is multicollinearity, is to run an analysis for the correlation between the variables. Table 4 presents the results, where results higher than 0.4 are marked. This means that multicollinearity issues might arise between cost per dollar loaned and interest rate, as well as between cost per dollar loaned and return on assets. Moreover, the collinearity between cost per borrower and average loan size may be excessively correlated. Furthermore, competition and return on assets might be correlated. In addition to this, multicollinearity issues may occur between profit orientation and regulation, between regulation and the interaction term of profit orientation and regulation, between profit orientation and the interaction of competition and profit orientation and regulation and profit orientation. Lastly, the interaction terms of regulation and profit

Table 4 – Correlations

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. LNAB	1.000																
2. AVLOAN	-.1773	1.000															
3. FEMALE	.3117	-.3119	1.000														
4. ROA	.0791	.0240	.0111	1.000													
5. PAR30	-.0862	.0291	-.1062	-.2167	1.000												
6. IR	-.0213	-.1562	.1733	.0685	-.0563	1.000											
7. COSTUSD	-.1183	-.1099	.1365	**-.5250**	.0187	**.6296**	1.000										
8. COSTBOR	-.2797	**.4176**	-.2960	-.0739	.0354	-.0083	.0726	1.000									
9. COMP	.0265	-.0049	.0821	**-.4773**	.1881	-.3138	.1849	-.0282	1.000								
10. REG	.2112	.1520	-.1558	.0345	-.0423	-.1689	-.1588	.0248	.0457	1.000							
11. PROFOR	.1768	.1177	-.0846	.0184	-.0012	.0916	.0364	.0693	-.0261	**.4147**	1.000						
12. COMPPROFOR	.1574	.1046	-.0450	-.1382	.0629	-.0794	.0544	.0658	.2894	.3736	**.8329**	1.000					
13. REGPROFOR	.2100	.1383	-.0905	.0319	-.0142	-.0291	-.0474	.0437	.0072	**.5877**	**.8740**	**.7575**	1.000				
14. AGE	.1992	-.0428	-.0219	.1383	.0896	-.1401	-.2475	-.0502	-.0633	-.0609	-.1931	-.1791	-.1300	1.000			
15. SIZE	.3365	.1363	-.1445	.1305	-.0461	-.1487	-.2792	.0587	-.0910	.2986	.2529	.1897	.2818	.2703	1.000		
16. GDPCAP	-.2581	-.1283	-.1604	.0300	.0054	.2545	.0834	.2807	-.2321	-.2026	.0127	-.0869	-.1218	.0396	.0225	1.000	
17. GDPGWTH	.0818	.0164	.0459	.0716	-.1214	-.0735	-.0350	-.0724	.0206	.1171	.0498	.0449	.1056	-.1354	-.0456	-.1856	1.000

orientation might be correlated with the interaction term of competition and profit orientation. To formally test for multicollinearity, the VIF test is conducted. The VIF between profit orientation, the interaction of regulation and profit orientation, and the interaction of competition and profit orientation are the only values that are higher than the minimal value of 2.5. However, the multicollinearity is not an issue since the values are all below the critical value of 10 (O'Brien, 2007). Therefore, no variables will be omitted from the analysis.

Besides multicollinearity, should be tested for heteroskedasticity and autocorrelation. When testing for heteroskedasticity with the Modified Wald test, it is observed that heteroskedasticity in the data is the case. After testing for heteroskedasticity, is tested for autocorrelation using Wooldridge test for autocorrelation in panel data. The results indicate that autocorrelation is present in the data. In addition, analysis that can be conducted should consist of fixed effects, random effect or pooled OLS. The Hausman test is conducted to choose between the fixed and random effects model. When conducting the Hausman test, the variables regulation, profit orientation and the interaction between profit orientation and regulation are omitted from the fixed effects analysis. Upon closer inspection of the data, it is observed that they are omitted because these independent variables do not have any within change. This implies that no MFI changed profit orientation, and that no MFI switched between regulated and unregulated between 2003 and 2011. Therefore, the fixed effects model will not be used. In order to test between the random effects model and pooled OLS model, the Breusch and Pagan Lagrangian multiplier test is conducted. The outcome of the analysis suggests that the random effects model is best fitted to the data. Therefore, the robust random effects model is chosen, which controls for both heteroskedasticity and autocorrelation (Cameron & Miller, 2015).

4.3 Test of Hypotheses

Table 7 represents the outcomes of the robust random effects model. On the basis of Table 7, the hypotheses proposed in chapter 2 will be answered. Hypothesis 1 expresses the expectation that competition has a negative effect on the social and financial performance of MFIs. Proxies for social performance are number of average borrowers, average loan size, and percentage of female borrowers. For the number of average borrowers a significant relationship is found, indicating that the higher the competition, the lower the number of average borrowers. This is consistent with the research of Assefa et al. (2013), who states that competition puts increased focus on the reduction of

Table 5 - Random Effects Results

	LNAB	AVLOAN	FEMALE	ROA	PAR30	IR	COSTUSD	COSTBOR
COMP	-0.768***	-0.119	-0.103	-0.581***	0.287***	-0.499***	0.679***	183.699***
	(0.002)	(0.469)	(0.107)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)
PROFOR	-0.018	0.086	-0.039	0.013	0.021	0.187***	0.097*	20.414
	(0.904)	(0.318)	(0.217)	(0.484)	(0.171)	(0.000)	(0.051)	(0.769)
COMPPROFOR	-0.500	0.123	0.089	-0.157	-0.014	-0.169*	0.507	87.611*
	(0.231)	(0.729)	(0.349)	(0.288)	(0.908)	(0.091)	(0.183)	(0.064)
REG	-0.205**	0.275***	-0.077***	0.002	0.000	-0.030***	-0.051***	353.008
	(0.024)	(0.000)	(0.000)	(0.670)	(0.980)	(0.004)	(0.003)	(0.397)
REGPROFOR	-0.216**	0.344***	-0.025	0.006	0.015**	0.058***	0.049	94.286***
	(0.016)	(0.001)	(0.206)	(0.379)	(0.023)	(0.000)	(0.341)	(0.005)
AGE	0.016	-0.062***	0.003	0.011***	0.016***	-0.009**	-0.029***	-15.024
	(0.460)	(0.004)	(0.630)	(0.001)	(0.000)	(0.013)	(0.000)	(0.105)
SIZE	0.736***	0.066***	-0.010***	0.004**	-0.004***	-0.025***	-0.040***	-0.383
	(0.000)	(0.000)	(0.005)	(0.028)	(0.007)	(0.000)	(0.000)	(0.929)
GDPCAP	-0.000***	-0.000***	-0.000**	-0.000***	0.000*	0.000***	0.000***	0.043***
	(0.000)	(0.000)	(0.010)	(0.002)	(0.067)	(0.001)	(0.000)	(0.000)
GDPGWTH	0.002	0.003	0.001***	0.002***	-0.002***	-0.000	-0.000	-1.599
	(0.247)	(0.178)	(0.006)	(0.000)	(0.000)	(0.771)	(0.571)	(0.166)
_cons	-2.020***	-0.371**	0.887***	-0.008	0.064**	0.701***	0.875***	38.452
	(0.000)	(0.048)	(0.000)	(0.753)	(0.015)	(0.000)	(0.000)	(0.500)

P-values in parentheses

* p<0.1, ** p<0.05, *** p<0.01

costs and a decreased focus on outreach. This might be a consequence of providing more and smaller loans to poorer clients, resulting in higher costs compared to providing less loans to wealthier clients. Therefore, competition is associated with lower outreach in the form of lower number of average borrowers, and consequently lower social performance of MFIs. Proxies for financial performance are return on assets, portfolio at risk 30 days, interest rate, cost per dollar loaned and cost per borrower. For the proxies for financial performance, all significant effects are found. The effect of return on assets and interest rate are negative, indicating that when competition increases these proxies decrease. The decrease of interest rate with rising competition is supported by general economic theory, which states that competition leads to lower prices (Stucke, 2013). Also, this supports the research of Fernando (2006), who finds that competition in the microfinance market can lead to lower interest rates. Moreover, the return on assets decline with an increase in competition. In addition to this, portfolio at risk 30 day, the cost per dollar loaned, and cost per borrower increase when the competition rises. This is in line with the expectation that competition increases information asymmetry (Broecker, 1990; Marquez, 2002), which in turn incentivizes multiple loan taking (McIntosh & Wydick, 2005). The multiple loan taking leads to a declining repayment rate (McIntosh et al., 2005; Vogelgesang, 2003), which results in a decreasing return on assets and increasing portfolio at risk 30 days that is found. To prevent this, MFIs need closer monitoring of their clients (McIntosh & Wydick, 2005). However, this is more intensive in terms of personnel and time, which may clarify the increased costs per dollar loaned and costs per borrower when competition increases. Therefore, a negative effect of competition on financial performance in found. All in all, this indicates a negative effect of competition on the social and financial performance of MFIs.

In hypothesis 2 is expected that for-profit and nonprofit MFIs are similar in terms of social and financial performance. For social performance and profit orientation, no significant results are found. Therefore, for-profit and nonprofit MFIs are similar in terms of social performance, which is in line with Mersland and Strøm (2008, 2009), and Tchakoute-Tchuigoua (2010). As for the proxies for financial performance, for-profit MFIs are found to charge a higher interest rate. In addition is found that for-profit MFIs have slightly higher costs per dollar loaned, this could be caused by for-profit MFIs that are less effective in the reduction of adverse selection and moral hazard problems (Hansmann, 1996). These results support the findings of Roberts (2013), who states that for-profit MFIs have higher costs and also charge higher interest rates. It may be the case that the increase in costs is due to higher agency costs, that are used to align the interests of the shareholders and MFIs and reduce the information asymmetry of for-profit MFIs (Jensen & Meckling, 1976). These higher costs may be the cause of the higher interest rate, since the for-profit MFIs have to compensate for their higher costs. Therefore can be concluded

that in terms of financial performance, for-profit and nonprofits are not similar.

Hypothesis 3 concerns the interaction between competition and profit orientation. This hypothesis states that when facing high competition, for-profit MFIs have a more positive social and financial performance than nonprofit MFIs. The findings however indicate that there are no significant differences between for-profit and nonprofit MFIs under the condition of competition. For financial performance is found that for-profit MFIs charge slightly lower interest rate when competition comes into play. This is in line with the findings of Baquero et al. (2012), and indicates that for-profit are more sensitive to the market pressures when competition comes into play. Also, for-profit MFIs have higher costs per borrower than nonprofit MFIs when subject to competition. This is caused by the higher quality for-profit are aiming to deliver when nonprofit MFIs are present in the market (Grabowski & Hirth, 2003; Santerre & Vernon, 2005). This indicates that under competition, for-profit and nonprofit MFIs are similar in terms of social performance. For financial performance, for-profit have a slightly negative performance compared to nonprofit MFIs, when competition is the case.

Hypothesis 4 consists of two hypotheses. Hypothesis 4a states that regulation has a positive effect on the social performance of MFIs. For regulation and the social performance of MFIs, the general indication from the model is that regulation has a negative effect on the social performance of MFIs. This is in contrast with the indirect positive effect expected, where collecting deposits will lead to increased outreach via the wealthier clients bearing the fixed costs (Mersland, 2009). Starting with the number of average borrowers, it is found that regulation has a negative impact on the number of average borrowers. This indicates that when regulation comes in, MFIs have less resources to put into finding and maintaining clients, which results in a decline in number of average borrowers. In addition, regulation has a positive effect on the average loan size. Since regulated MFIs are allowed to take deposits, they will attract wealthier clients who in turn ask for bigger loans (Richardson, 2003). This is also in line with Cull et al. (2011), who state that when higher costs have to be carried, MFIs can compensate this by taking larger loan sizes. Lastly, regulation has a negative effect on the percentages of female borrowers, which is in line with Cull et al. (2011). Moreover, the findings support the mission drift argumentation, where the requirements of complying with regulation in theory may result in a shift away from the social performance of MFIs (Hartarska & Nadolnyak, 2007). These results are contradicting with the empirical findings of Mersland and Strøm (2009) and Hartarska and Nadolnyak (2007), who found that regulation has no significant effect on the social and financial performance of MFIs. Hypothesis 4b states that regulation has a negative effect on the financial performance of MFIs. For the effect of regulation on financial performance, it is found that regulation has a significant effect

on the interest rate and the cost per dollar loaned. For the interest rate, regulated MFIs have an overall lower interest rate compared to unregulated MFIs. This may be caused by the interest rate controls that regulated MFIs are submitted to, where the MFI can only charge up to the maximum interest rate (Olsen, 2010). In addition, the costs per dollar loaned are going down. This might be caused by the higher average loan sizes borrowed, which lowers the amount of loans provided. Since less loans are provided and less clients have to be maintained, the costs per dollar loaned can go down. Therefore, can be stated that regulation has a negative impact on the social performance of MFIs. The impact of regulation on the financial performance is mixed, with lower interest rate and lower costs per dollar loaned.

Hypothesis 5 focuses on the interaction between regulation and profit orientation. There is expected that for-profit MFIs have lower social performance than nonprofit MFIs when they are subject to regulation. For social performance is found that number of average borrowers is significantly lower and average loan size is significantly higher for for-profit MFIs compared to nonprofit MFIs, when both are subject to regulation. This may indicate that mission drift might be the case, where less clients are served with a higher average loan size to focus more on the financial performance (Copestake, 2007). This means that the findings of Navajas et al. (2003), who state that for-profit MFIs have wealthier clients who ask for bigger loans, also hold under the condition of regulation. For financial performance, it is expected that for-profit MFIs have higher financial performance when subject to regulation. It is found that for-profit MFIs have significantly higher portfolio at risk 30 days, higher interest rate and higher cost per borrower when compared to nonprofit MFIs, when both subject to regulation. The higher portfolio at risk 30 days for for-profit MFIs is supported by the agency theory, where is stated that agency costs of nonprofits will be lower, since their relationship with their clients is closer (Hansmann, 1996) and they consequently receive more information of their clients (Assefa et al., 2013). The higher interest rate of for-profits MFIs is in line with the mission drift argument, where higher interest are charged in order to get an increased profit (Copestake, 2007). An alternative explanation might be that the higher interest rate is charged to cover the significantly higher cost per borrower. The costs per borrower may be higher due to the wealthier borrowers that take on bigger loans, which have an increased price when compared to the smaller loans poorer clients take on (Hartarska & Nadolnyak, 2007). From this can be concluded that for-profit have a decreased social and financial performance, when both are subject to regulation, where for-profit MFIs charge a higher interest rate.

4.4 Robustness Test

For the measurement of competition, the Lerner index is used. To check whether the results of the Lerner index are robust for different measurement of competition, the Boone indicator is used as a

robustness test. The Boone indicator takes the effect of efficiency on performance, this means the stronger the competition the more negative the Boone indicator. The model is as follows, as in Kar (2016):

$$ln\,\pi_{it} = \alpha + \sum_{t=1}^{T} \beta_j ln(MC_{it}) + \sum_{t=1}^{T} \alpha_t d_t + \mu_{it}$$

where π represents the profit of MFI i at time t, MC is marginal costs, β is the Boone indicator and d is the time dummy. ROA will be taken as a proxy for profits. The marginal costs will be measured with cost of labour, cost of funds and cost of capital as inputs. This means the translog cost function is used to estimate the total costs:

$$\ln TC_{it} = \alpha_0 + \delta_1 lny_{it} + \frac{1}{2}\delta_2 (lny_{it})^2 + \sum_{j=1}^{3} \alpha_j \ln w_{jit} + ln\, y_j \sum_{j=1}^{3} \alpha_j ln\, w_{jit} +$$

$$\frac{1}{2}\sum_{j,k=1}^{3} \alpha_{jk} ln\, w_{jit} ln\, w_{kit} + \sum_{t=1}^{T-1} \alpha_t\, d_t + \varepsilon_{it}$$

where TC_{it} is the total cost of MFI i at year t, measured by total expenses to total assets, y represents the output, and w_j reflects the input prices (labor, capital and funds). Cost of labour will be measured using personnel expenses to total assets. The cost of funds will be measured with financial expenses to total assets and cost of capital will be measured using administrative expenses to total assets. In addition, gross loan portfolio will be used as a proxy for output.

Then the marginal cost function can be obtained, which will be used as an input to estimate the Boone indicator. When taking the derivative of this function with respect to *ln y*, the marginal cost function is formulated as follows:

$$MC_{it} = \left(\frac{TC_{it}}{y_{it}}\right)(\delta_0 + \delta_1 lny_{it} + \sum_{j=1}^{3} \delta_{j+1} + ln\, w_{jit})$$

The marginal costs per year will be input for the Boone indicator model specified above, where the estimated output is specified in Table 6. To make the yearly Boone indicator and the competition measure comparable, the mean value of the competition per year is obtained for the sample. In Table 7, is observed that the competition measurement based on the Lerner index increases. This indicates that the competition in the microfinance market increases. When looking at Table 6, is found that the value of the Boone indicator decreases over time since 2003. The Boone indicators that decreases, is an indication of increased competition in the market (Kar, 2016). Therefore, the measure of competition is robust when comparing the Lerner index with the Boone indicator.

Table 6 – Boone values per year

Year	Boone value
2003	0
2004	-0.019145
2005	-0.5206973
2006	-1.012592
2007	-1.375747
2008	-1.657848
2009	-2.37727
2010	-2.622988
2011	-2.985885

Table 7 – Competition values per year (1 – Lerner Index)

Year	Competition
2003	0.1011931
2004	0.1063318
2005	0.1125405
2006	0.1151024
2007	0.1161427
2008	0.1179206
2009	0.1205115
2010	0.1212534
2011	0.1214121

5. Conclusion and Discussion

5.1 Conclusion

In the past microfinance has showed its ability to reduce poverty, in favour of the local economy and the MFIs' clients (Khandker, 2005). However, the social and financial performance of MFIs varies (Ahlin et al., 2011), which might be caused by several factors. This study analysed the relationship between competition, profit orientation and regulation and social and financial performance of MFIs. Additionally, this study is one of the first to look at the interaction between profit orientation and competition, and the interaction between profit orientation and regulation. Analysing these relationships is done by composing hypotheses regarding the various independent variables and their impact on the social and financial performance of MFIs. The literature regarding competition argues that competition has a negative effect on the social and financial performance of MFIs. Consequently, the relation between profit orientation and financial performance is described, resulting in the expectation that for-profit firms and nonprofit firms are similar in terms of financial performance. Regarding social and financial performance, for-profit firms are believed to have a negative effect compared to nonprofit firms. In addition, the interaction effect from competition and profit orientation on social and financial performance is discussed. For this relationship is stated that when MFIs are facing high competition, for-profit MFIs are expected to have a positive social and financial performance compared to nonprofit MFIs. For regulation, it is argued that regulation has a negative effect on the social and financial performance of MFIs. Lastly, the interaction between regulation and profit orientation is discussed, where it is expected that when subject to regulation, for-profit MFIs have a lower social performance and a higher financial performance when compared to nonprofit MFIs.

For the effect of competition on the social and financial performance of MFIs, it is found that with increased competition the number of average borrowers decreases. This is in line with Assefa et al. (2013), who argues that when competition rises the focus shifts from outreach towards reducing the costs. In addition, with increasing competition the interest rate goes down. This supports the general economic theory on pricing and competition (Stucke, 2013) and other empirical results (Fernando, 2006). On top of that, when competition rises, the costs per dollar loaned go up. This is the result of multiple loan taking by clients, which leads to a worse repayment rate and a consequent need of more intensive monitoring by the personnel (McIntosh & Wydick, 2005). The worse repayment rate results in lower return on assets and increasing portfolio at risk 30 days when competition increases. To prevent this, MFIs are closer monitoring their clients (McIntosh & Wydick, 2005). Nevertheless, since this costs

more money, the costs per dollar loaned and costs per borrower go up when competition increases. Therefore might be concluded that competition has a negative effect on the social and financial performance of MFIs.

Other expectations of this study were that for-profit and nonprofit MFIs are similar in terms of social and financial performance. This expectation is based on previous empirical research (Hartarska & Nadolnyak, 2007; Mersland & Strøm, 2008, 2009). For the social performance it is found that for-profit and nonprofit MFIs are similar. Considering the financial performance, for-profit MFIs are found to charge higher interest rate and have higher costs per dollar loaned than nonprofit MFIs. This is supported by Roberts (2013), who finds that compared to nonprofit MFIs, for-profit MFIs charge higher interest rates and have higher costs. It may be the case that higher costs are made for for-profit MFIs in terms of compensation, in order to reduce information asymmetry. These higher costs are the cause of the higher interest rate, since the for-profit MFIs have to compensate for their higher costs. Therefore can be concluded that in terms of financial performance, for-profit and nonprofits are not similar.

Following the individual effect of competition and profit orientation on the social and financial performance of MFIs, the interaction between the two terms is taken into account. Findings indicate that for-profit MFIs do not have a more positive social performance when under competitive pressures, compared to nonprofit MFIs. For financial performance, under competition for-profit MFIs charge a lower interest rate than nonprofit MFIs. This indicates that for-profits are more sensitive to market pressures when subject to competition (Baquero et al., 2012). Also, for-profit MFIs have higher costs per borrower than nonprofit MFIs when subject to competition.

The effect of regulation on the social performance of MFIs is negative, with a lower number of average borrowers, higher average loan size and a lower percentage of female borrowers. These results support the mission drift argument, which states that complying with regulation may result in a shift from social performance (Hartarska & Nadolnyak, 2007). For the financial performance and regulation is found that regulated MFIs have a lower overall interest rate, which may be caused by the interest rate controls (Olsen, 2010). Also, the costs per dollar loaned are lower for regulated MFIs. Regulated MFIs can namely take deposits, from wealthier clients, that take on bigger loans and bear a great deal of the fixed costs of MFIs (Cull et al., 2011; Richardson, 2003).

For the interaction between regulation and profit orientation and the social performance of MFIs, evidence is found for a significantly lower number of average borrowers and significantly higher average loan size. This supports the mission drift, where the focus shifts from social performance to financial

performance (Copestake, 2007). The financial performance of for-profit MFIs is, additionally, lower compared to nonprofit MFIs, where both are subject to regulation. Portfolio at risk 30 days is significantly higher for for-profit and regulated MFIs, indicating that for-profit MFIs have higher agency costs. The higher costs per borrower can be explained due to the fact that for-profit MFIs generally have wealthier clients, who ask for bigger loans (Hartarska & Nadolnyak, 2007). This might be compensated by charging higher interest rate.

This study will contribute in the following ways. First of all, this study will shed new light on the relationship between competition, profit orientation, and regulation and the social and financial performance of MFIs. Secondly, or the measurement of competition, this study is the first to use the Lerner index and the Boone indicator to measure competition. Studies on the Lerner index (Assefa et al., 2013) and the Boone indicator (Kar, 2016) have been done separately. Moreover, the dataset used has data on MFIs over a long period of time and it is worldwide. For comparison, the study of Assefa et al. (2013) had 1247 observations and the study of Kar (2016) had 1144 observations. Therefore, the claims made in this study are based on a worldwide sample of MFIs with a significant amount of observations. Furthermore, the interaction effect of profit orientation and competition has some new conclusions for the microfinance sector. While is argued that the increase of for-profit MFIs and an increase of competition in the microfinance market decreases the social performance of MFIs (Assefa et al., 2013; Copestake, 2007), this study shows that there are no significant differences between for-profit and nonprofit MFIs when subject to competition. Lastly, the interaction between profit orientation and regulation has some new implications for the microfinance sector. For-profit MFIs have lower social performance compared to nonprofit MFIs, when both are subject to regulation. This may indicate that mission drift is the case for this relationship (Copestake, 2007), where for-profit MFIs have wealthier clients who ask bigger loans (Navajas et al., 2003). In addition, a decreased financial performance is found for for-profit MFIs when compared to nonprofit MFIs, both under the condition of regulation. This may indicate that regulation is not as protecting to the client as one might expect. In the subsequent section, the possibilities for further research and the limitations of this study are discussed.

5.2 Limitations and further research

This study has some limitations that have to be kept in mind. First, the data used has its limitations. As noted before, the data from the MIX Market is self-reported and therefore can contain errors. In order to reduce the possibility of incorrect data, only data that is ranked with 3 stars or higher was taken into account within this study. This means that it includes general, outreach, and financial data for at least two consecutive years, with audited financial statements where available. Second, this study makes a

selection of controls based on the literature. This naturally means that some variables having influence are being left out. Moreover, the measures of profit orientation and regulation are reflected on as dummy variables. Therefore, high multicollinearity arises between the two. In order to solve this, the random effects robust model was used. However, this might not be the most suitable model, as it might cause the loss of some explanation power.

In addition to the limitations, there is room for future research in this area. First, a more complete picture of the relationships in this study can be obtained, when other indicators of social or financial performance are used. For example, for regulation one addition measure could be number of deposits. Secondly, further research on the interaction between profit orientation and competition would be feasible. In addition, based on this study can be looked at more qualitative measures of performance, as suggested in Santerre and Vernon (2005). Furthermore, it could be feasible to look at regulation on country level. This study looked at the MFI-level, but it might be the case that countries with for example more strict regulation in general have more or less regulated MFIs. In addition, for the interaction between profit orientation and regulation, the power of the claims made will increase when additional studies look into this interaction effect. Moreover, the results found in this study concerning the interaction between profit orientation and regulation can be confirmed using further research. Since this study is the first one to look into this relationship, validation of the arguments made would be useful.

References

Abbink, K., Irlenbusch, B., & Renner, E. (2006). Group size and social ties in microfinance institutions. *Economic Inquiry*, *44*(4), 614-628.

Ahlin, C., Lin, J., & Maio, M. (2011). Where does microfinance flourish? Microfinance institution performance in macroeconomic context. *Journal of Development Economics*, *95*(2), 105-120.

Al-Azzam, M. (2016). Corruption and Microcredit Interest Rates: Does Regulation Help?. *Bulletin of Economic Research*, *68*(1), 182-202.

Anderson, D. R., Sweeney, D. J., Williams, T. A., Camm, J. D., & Cochran, J. J. (2008). *Statistics for business and economics* (10th edition). Mason, OH: South-Western Cengage Learning.

Armendáriz, B., & Morduch, J. (2005). *The economics of microfinance*. Cambridge, MA: MIT Press.

Assefa, E., Hermes, N., & Meesters, A. (2013). Competition and the performance of microfinance institutions. *Applied Financial Economics*, *23*(9), 767-782.

Ayayi, A. G., & Sene, M. (2010). What drives microfinance institution's financial sustainability. *The Journal of Developing Areas*, *44*(1), 303-324.

Baquero, G., Hamadi, M., & Heinen, A. (2012). *Competition, loan rates and information dispersion in microcredit markets* (ESMT Working Paper 12-02). Retrieved from: https://www.econstor.eu/bitstream/10419/96528/1/ESMT-12-02.pdf

Barth, J. R., Caprio, G., & Levine, R. (2008). *Rethinking bank regulation: Till angels govern*. New York, NY: Cambridge University Press.

Bassem, B. S. (2012). Social and financial performance of microfinance institutions: Is there a trade-off? *Journal of Economics and International Finance*, *4*(4), 92.

Beck, T., & Demirgüç-Kunt, A. (2008). Access to finance: An unfinished agenda. *The world bank economic review*, *22*(3), 383-396.

Berger, A. N. (1995). The profit-structure relationship in banking--tests of market-power and efficient-structure hypotheses. *Journal of Money, Credit and Banking*, *27*(2), 404-431.

Berger, A. N., Demirguc-Kunt, A., Levine, R., & Haubrich, J. G. (2004). Bank concentration and

competition: An evolution in the making. *Journal of Money, Credit, and Banking*, *36*(3), 433-451.

Brand, M., & Gerschick, J. (2000). *Maximizing efficiency in microfinance: The path to enhanced outreach and sustainability*. Somerville, MA: ACCION International.

Brau, J. C., & Woller, G. M. (2004). Microfinance: A comprehensive review of the existing literature. *The Journal of Entrepreneurial Finance*, *9*(1), 1-26.

Bresnahan, T. F., & Reiss, P. C. (1990). Entry in monopoly market. *The Review of Economic Studies*, *57*(4), 531-553.

Broecker, T. (1990). Credit-worthiness tests and interbank competition. *Econometrica: Journal of the Econometric Society 58*, 429-452.

Burzynska, K., & Berggren, O. (2015). The impact of social beliefs on microfinance performance. *Journal of International Development*, *27*(7), 1074-1097.

Cameron, A. C., & Miller, D. L. (2015). A practitioner's guide to cluster-robust inference. *Journal of Human Resources*, *50*(2), 317-372.

Christen, R. P. and Rosenberg, R. (2000) *The Rush to Regulate: Legal Frameworks for Microfinance.* Consultative group to assist the poorest (CGAP), Washington DC: The World Bank Group.

Christen, R. P., Lyman, T. R., & Rosenberg, R. (2003). *Microfinance consensus guidelines: Guiding principles on regulation and supervision of microfinance*. Consultative group to assist the poorest (CGAP), Washington DC: The World Bank Group.

Claessens, S., & Laeven, L. (2004). What drives bank competition? Some international evidence. *Journal of Money, credit, and Banking*, *36*(3), 563-583.

Copestake, J. (2007). Mainstreaming microfinance: Social performance management or mission drift?. *World Development*, *35*(10), 1721-1738.

Crespí, R., García-Cestona, M. A., & Salas, V. (2004). Governance mechanisms in Spanish banks. Does ownership matter? *Journal of Banking & Finance*, *28*(10), 2311-2330.

Cull, R., & Morduch, J. (2007). Financial performance and outreach: A global analysis of leading microbanks. *The Economic Journal*, *117*(517), F107-F133.

Cull, R., Demirgüç-Kunt, A., & Morduch, J. (2011). Does regulatory supervision curtail microfinance

profitability and outreach? *World Development*, *39*(6), 949-965.

Cull, R., Demirgüç-Kunt, A., & Morduch, J. (2014). Banks and microbanks. *Journal of Financial Services Research*, *46*(1), 1-53.

Dalla Pellegrina, L. (2011). Microfinance and investment: A comparison with bank and informal lending. *World Development*, *39*(6), 882-897.

De Guevara, J. F., Maudos, J., & Pérez, F. (2005). Market power in European banking sectors. *Journal of Financial Services Research*, *27*(2), 109.

Dewatripont, M., & Tirole, J. (1994). A theory of debt and equity: Diversity of securities and manager-shareholder congruence. *The Quarterly Journal of Economics*, *109*(4), 1027-1054.

Dijck, P. V., Nusselder, H., & Sanders, A. (2004). *Microfinance in Nicaragua*. Centre for Latin American Research and Documentation (CEDLA).

Djankov, S., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2002). The regulation of entry. *The quarterly Journal of economics*, *117*(1), 1-37.

Fernando, N. A. (2006). Understanding and dealing with high interest rates on microcredit. *Asian Development Bank, 13*, 90-106.

Ferro-Luzzi, G., & Weber, S. (2006). Measuring the performance of microfinance institutions. *Microfinance and public policy*, 153-169. London: Palgrave MacMillan.

Freixas, X., & Rochet, J. C. (1997). *Microeconomics of Banking*. Cambridge, MA: MIT Press.

Galor, O., & Zeira, J. (1993). Income distribution and macroeconomics. *The review of economic studies*, *60*(1), 35-52.

Gerber, D. J. (1998). *Law and competition in twentieth century Europe: protecting Prometheus*. Oxford, UK: Oxford University Press.

Grabowski, D. C., & Hirth, R. A. (2003). Competitive spillovers across non-profit and for-profit nursing homes. *Journal of health economics*, *22*(1), 1-22.

Guha, B., & Chowdhury, P. R. (2013). Micro-finance competition: Motivated micro-lenders, double-dipping and default. *Journal of Development Economics*, *105*, 86-102.

Hansmann, H. (1996). *The ownership of enterprise.* Cambridge, MA: The Belknap Press of Harvard University Press.

Hartarska, V. (2005). Governance and performance of microfinance institutions in Central and Eastern Europe and the newly independent states. *World development*, *33*(10), 1627-1643.

Hartarska, V., & Nadolnyak, D. (2007). Do regulated microfinance institutions achieve better sustainability and outreach? Cross-country evidence. *Applied Economics*, *39*(10), 1207–1222.

Hermes, N., & Lensink, R. (2007). The empirics of microfinance: What do we know?. *The Economic Journal*, *117*, F1–F10.

Hermes, N., & Meesters, A. (2011). The performance of microfinance institutions: Do macro conditions matter. *The handbook of microfinance*, 173-201. New Jersey: World Scientific.

Hermes, N., Lensink, R., & Meesters, A. (2011). Outreach and efficiency of microfinance institutions. *World Development*, *39*(6), 938-948.

Hirth, R. A. (1999). Consumer information and competition between nonprofit and for-profit nursing homes. *Journal of Health Economics*, *18*(2), 219-240.

Hisako, K. (2009) Competition and wide outreach of microfinance institutions. *Economics Bulletin, 29*(4), 2628–39.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, *3*(4), 305-360.

Kai, H. (2009). Competition and wide outreach of microfinance institutions. *Economics Bulletin*, *29*(4), 2628–2639.

Kar, A. K. (2016). Measuring competition in microfinance markets: a new approach. *International Review of Applied Economics*, *30*(4), 423-440.

Khandker, S. R. (2005). Microfinance and poverty: Evidence using panel data from Bangladesh. *The World Bank Economic Review*, *19*(2), 263-286.

Krauss, N., & Walter, I. (2009). Can microfinance reduce portfolio volatility?. *Economic Development and Cultural Change*, *58*(1), 85-110.

Lafourcade, A. L., Isern, J., Mwangi, P., & Brown, M. (2005). Overview of the outreach and financial

performance of Microfinance Institutions in Africa. *The Mix MicroBanking Bulletin 14*, 7–10.

Leibenstein, H. (1966). Allocative efficiency vs." X-efficiency". *The American Economic Review*, *56*(3), 392-415.

Lerner, A. (1995). The concept of monopoly and the measurement of monopoly power. In *Essential Readings in Economics* (pp. 55-76). London: Macmillan Education UK.

Louis, P., Seret, A., & Baesens, B. (2013). Financial efficiency and social impact of microfinance institutions using self-organizing maps. *World Development*, *46*, 197-210.

Love, I., & Martínez Pería, M. S. (2015). How bank competition affects firms' access to finance. *The World Bank Economic Review*, *29*(3), 413-448.

Marquez, R. (2002). Competition, adverse selection, and information dispersion in the banking industry. *Review of financial Studies*, *15*(3), 901-926.

Mayer, C. (1997). Corporate governance, competition, and performance. *Journal of Law and Society*, *24*(1), 152-176.

McIntosh, C., & Wydick, B. (2005). Competition and microfinance. *Journal of development economics*, *78*(2), 271-298.

McIntosh, C., Janvry, A., & Sadoulet, E. (2005). How rising competition among microfinance institutions affects incumbent lenders. *The Economic Journal*, *115*(506), 987-1004.

Mersland, R. (2009). The cost of ownership in microfinance organizations. *World Development*, *37*(2), 469-478.

Mersland, R. (2011). The governance of non-profit microfinance institutions: lessons from history. *Journal of management & governance*, *15*(3), 327-348.

Mersland, R., & Strøm, R. Ø. (2008). Performance and trade-offs in Microfinance Organisations—Does ownership matter?. *Journal of International Development*, *20*(5), 598-612.

Mersland, R., & Strøm, R. Ø. (2009). Performance and governance in microfinance institutions. *Journal of Banking & Finance*, *33*(4), 662-669.

Mersland, R., & Strøm, R. Ø. (2010). Microfinance mission drift?. *World Development*, *28*(1), 28-36.

Mersland, R., & Strøm, R. Ø. (2012). What drives the microfinance lending rate? Midwest Finance Association Annual Meeting Paper. Retrieved from: http://ssrn.com/abstract=2144618.

MIX Market (2017). Glossary. Retrieved from: https://www.themix.org/resource/glossary/glossary

Morduch, J. (1999). The microfinance promise. *Journal of economic literature*, *37*(4), 1569-1614.

Morduch, J. (2000). The microfinance schism. *World development*, *28*(4), 617-629.

Motta, M. (2004). *Competition policy: theory and practice*. Cambridge, UK: Cambridge University Press.

Navajas, S., Conning, J., & Gonzalez-Vega, C. (2003). Lending technologies, competition and consolidation in the market for microfinance in Bolivia. *Journal of International Development*, *15*(6), 747-770.

O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity*, *41*(5), 673-690.

Olsen, T. D. (2010). New actors in microfinance lending: The role of regulation and competition in Latin America. *Perspectives on Global Development and Technology*, *9*(3), 500-519.

Petersen, M. A., & Rajan, R. G. (1995). The effect of credit market competition on lending relationships. *The Quarterly Journal of Economics*, *110*(2), 407-443.

Quayes, S. (2012). Depth of outreach and financial sustainability of microfinance institutions. *Applied Economics*, *44*(26), 3421-3433.

Quayes, S., & Hasan, T. (2014). Financial disclosure and performance of microfinance institutions. *Journal of Accounting & Organizational Change*, *10*(3), 314-337.

Raith, M. (2003). Competition, Risk and Managerial Incentives. *American Economic Review*, *93*(4), 1424-1436

Richardson, D. (2003). Going to the barricades for microsavings mobilization: A view of the real costs from the trenches. *MicroBanking Bulletin*, *9*, 9-13.

Roberts, P. W. (2013). The profit orientation of microfinance institutions and effective interest rates. *World Development*, *41*, 120-131.

Santerre, R. E., & Vernon, J. A. (2005). *Hospital ownership mix efficiency in the US: An exploratory study* (No. w11192). National Bureau of Economic Research.

Schreiner, M. (2002). Aspects of outreach: A framework for discussion of the social benefits of microfinance. *Journal of international development*, *14*(5), 591-603.

Shankar, S., & Asher, M. G. (2010). Regulating microfinance: A suggested framework. *Economic and Political Weekly 45*(1), 15-18.

Strøm, R. Ø., D'Espallier, B., & Mersland, R. (2014). Female leadership, performance, and governance in microfinance institutions. *Journal of Banking & Finance*, *42*, 60-75.

Stucke, M. E. (2013). Is competition always good?. *Journal of antitrust Enforcement*, *1*(1), 162-197.

Tchakoute-Tchuigoua, H. (2010). Is there a difference in performance by the legal status of microfinance institutions?. *The quarterly review of economics and finance*, *50*(4), 436-442.

Vanroose, A., & D'Espallier, B. (2013). Do microfinance institutions accomplish their mission? Evidence from the relationship between traditional financial sector development and microfinance institutions' outreach and performance. *Applied Economics*, *45*(15), 1965-1982.

Van Leuvensteijn, M., Bikker, J. A., van Rixtel, A. A., & Sørensen, C. K. (2011). A new approach to measuring competition in the loan markets of the euro area. *Applied Economics*, *43*(23), 3155-3167.

Vogelgesang, U. (2003). Microfinance in times of crisis: The effects of competition, rising indebtedness, and economic crisis on repayment behavior. *World Development*, *31*(12), 2085-2114.

World Bank (2016). Poverty overview. Retrieved from:

http://www.worldbank.org/en/topic/poverty/overview

World Bank (2017). World development indicators. Retrieved from:

http://data.worldbank.org/data-catalog/world-development-indicators

Wright, G. (2000). *Microfinance systems: Designing quality financial services for the poor*. New York, NY: Zed Books.

Appendix A: Estimation translog cost function Lerner index and Boone indicator

Table A1 - Results of estimation of translog cost function

Independent Variables	ln(TotalCosts)	
	Lerner Index	Boone indicator
ln y	0.243***	0.009
	(0.000)	(0.830)
ln w1	0.780***	0.874***
	(0.000)	(0.000)
ln w2	0.368***	0.528***
	(0.001)	(0.000)
ln w3		0.948***
		(0.000)
trend	0.152***	-0.002**
	(0.000)	(0.030)
$(\ln y)^2$	0.016***	-0.003**
	(0.000)	(0.041)
$(\ln w1)^2$	-0.022***	0.064***
	(0.003)	(0.000)
$(\ln w2)^2$	0.048***	0.049***
	(0.000)	(0.000)
$(\ln w3)^2$		0.064***
		(0.000)
$trend^2$	-0.002***	
	(0.000)	
ln y * w1	-0.000***	-0.010***
	(0.000)	(0.012)
ln y * w2	-0.010	0.000
	(0.482)	(0.990)
		-0.020***
		(0.000)
ln w1 * ln w2	0.017***	
	(0.044)	
ln w1 * trend	-0.007***	
	(0.000)	
ln w2 * trend	0.005**	
	(0.020)	
Constant	1.823***	2.756***
	(0.012)	(0.000)
Observations	5778	2077
R-squared	0.9338	0.9676

P-values in parentheses

* p<0.1, ** p<0.05, *** p<0.01