

Master's Thesis in Business Administration

Chief executive officer characteristics and microfinance institutions performance

A global survey

by

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A thesis submitted in partial fulfilment of the requirements of the University of Agder for the master program in Business administration degree and, therefore, approved as a part of this education. However, the university is not responsible for the methods applied or the conclusions drawn.

University of Agder, June 2012

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DECLARATION

I attest that this work has never been submitted in evidence for any degree, and it is not concurrently submitted for any other degree than that of the master thesis studied at University of Agder. Also, I declare that this work is the outcome of my own investigations with exceptions only where acknowledged by references and that, I have not plagiarised another's work

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LIST OF ACRONYMS AND ABBREVIATIONS

CEO	-	Chief Executive Officer
CEOBEDU	-	Chief executive Business education
CEOBEXP	-	Chief executive officer Business experience
MFI	-	Microfinance institutions
PaR30	-	Portfolio at Risk for more than 30 days
AROA	-	Adjusted Return on assets
CGAP	-	Consultative Group for assisting the poor
HDI	-	Human Development Index
OSS	-	Operational Self-Sufficiency
MBA	-	Masters of Business Administration
Uia	-	University of Agder
CGAP	-	Consultative Group to Assist the Poor
ROE	-	Return on equity
FEM	-	Fixed effect Model
REM	-	Random effect model
SST	-	Sum square total
Wclients	-	Percentage of women clients
CrClients	-	Credit clients
Lsize	-	Average loan size

ABSTRACT

This study examines the relationship between formal business education, business experience as CEO characteristics and MFIs performance. It uses a global dataset of 403 rated MFIs located in 74 countries for the period of 2001 to 2009. This study uses random effects panel data estimations to analyse the effect of CEO with formal business education and business experience on return on assets, portfolio at risk of 30 days, which measures financial performance, and average loan size, percentage of women clients and number of credit clients, which capture, outreach performance. The results show that MFIs with CEO with business experience have better return on assets, few loan defaults, smaller loan size, higher percentage of women clients and associated with credit clients' increase compared to MFIs with CEO without business experience. While MFIs with CEO with formal business education have a higher percentage of women clients, credit clients' growth and smaller loan size compared to MFIs with CEO without formal business education, the study find no difference in performance on return on assets and portfolio at risk for 30 days. These findings suggest that, in the future, the microfinance industry can benefit from non-microfinance industry CEO with business experience.

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CHAPTER ONE: INTRODUCTION

This chapter discusses the background study of CEOs characteristics influence in MFIs performance, statement of the research problem, objective, research question, contribution of the study and organisation of the study.

1.1 Background of the study

Microfinance institutions (MFIs) are organisations that offer banking services to poor people, who are economically in desperate need of a small amount of loan to finance for, example, their business, educations, manage emergencies, obtain assets, or smooth consumption (Di Bella, 2011).

Existing Chief executive officers (CEO) and MFI performance literatures focuses on the role of CEO gender and MFI performance (e.g. Strøm. et al., working paper, Mersland and Strøm, 2009b), impact of duality of CEO and MFI performance (e.g. Galema et al., 2012) and, the role of founder CEO and MFI performance (e.g. Mersland. et al., 2011). There are few empirical findings related to CEO characteristics, or top management team demographic profile influences and MFI performance (Sow Hup, 2010). This study responds into filling this gap by investigating the influence of CEO characteristics on MFI performance, in particular, with the focus on CEO formal business education and business experience. The influence of CEO in any firm cannot be ignores because;

“CEOs control the management staff of a firm and acts as the liaison between company employees and the Board of Directors. CEOs are responsible for planning and implementing the strategy of a firm and are accountable for the success or failure of a firm through the Board of Directors and shareholders” (Martelli and Abels, 2011pp.19).

The CEOs have potential impact to influence performance in MFIs if she/he has leadership quality, management quality and development quality (Midgal et al., 2006) provided there is strong board of directors and strong senior management (Galema et al., 2012, Mori and Mersland, 2011, Hudon, 2010). Particularly, they steer efficient productivity, performance and development of staff within the MFI and are responsible for maintaining sound financial solvency by having the ability to mobilize financial resource (Ruth Jacobs et al., 2007).

The empirical research on CEO characteristics¹ and MFI performance is few and limited; hence this study uses empirical findings from international business corporations for better understand the role of CEO characteristics in MFI performance and managerial implications thereof (Mersland et al., 2011). Both microfinance and international business research on corporations show that, in general, characteristic of CEO is indispensable in any organisations (Martelli and Abels, 2010, Martelli and Abels, 2011, Gwin, 2011, Mersland and Strøm, 2009b, Chan, 2010). Among the characteristics of the CEO which have empirical evidence in international business corporations, includes formal business education and business experience, of which shows, to have influence in firm performance (Gottesman and Morey, 2010, Bhagat et al., 2010a, Soriano and Castrogiovanni, 2012, Guthrie and Datta, 1997). This implies that MFIs can benefit from formal business education and business experience of CEOs as the business corporations does. By studying the influence of CEOs formal business education and CEOs business experience on MFIs performance, decision makers can have a better understanding of whether the existing labor force of CEOs has influence in MFIs performance and if CEOs with business experience from non-microfinance can be employed in MFIs successful and drive MFIs performance.

1.2 Statement of the research problem

In MFIs, lack of professionalism and technical expertise at senior management level creates poor internal controls environment and poor implementation and formulation of strategies, particularly being lack of senior management level with experience and coupled with finance and banking (Lascalles, 2011). Therefore, these impediments to the microfinance industry need to be addressed empirically from different scenes for future prospect of the industry and the people it serves. Considering the role of CEO in MFI, it is the purpose of this study to examine the way CEO formal business education and business experience overcome these impediments and contributes into MFIs performance.

1.3 Research objective

To analyse the relationship between formal business education, business experience as CEOs characteristics and MFIs performance

¹ Formal business education and business experience

1.4 Research question

Do the MFIs with CEO with formal business education and business experience have better performance compared with MFIs with CEO without formal business education and business experience?

1.5 Contribution of the study

Using Resource Based Theory and Upper echelons theory, this study provides a better understanding of the management succession in MFIs. This study adds literature to the international business management and strategy of MFI by linking the management; governance of MFIs and, the importance of training, human capital investments and CEOs labour market (Deresky, 2011, Thomsen, 2008, Garibaldi, 2006).

1.6 Organisation of the study

This study organised as follows. There are six chapters. Microfinance global industry and CEO labor markets covered in chapter two. Theoretical background, conceptual framework and hypotheses, covered in chapter three. Chapter four cover the methodology of the study and chapter five cover the findings and data analysis. Chapter six cover discussion, conclusion, theoretical, policy and managerial implications, areas for future studies and limitations of the study.

CHAPTER TWO: MICROFINANCE INDUSTRY AND CEOs LABOR MARKET

This chapter provides overview of the global microfinance industry and CEOs labor market in MFIs.

2.1 Global Microfinance industry

Microfinance refers to the provision of small loan and other related financial services like savings, money transfer services and microinsurance to poor people and microenterprises (Karlan and Goldberg, 2011, Mersland, 2009b). The microfinance industry became popular when the founder of Grameen bank Muhammad Yunus and the Grameen bank received a ²Nobel Peace Prize in 2006 recognizing the effort in creating economic and social opportunities for the poor people through lending small amount of money (Tharoor, 2006). From his book, (Yunus, 1999) it took him relentless effort to pioneer the idea of microfinance as a mean to fight poverty hence be recognised by the policy maker within the government. He was the founder and CEO of the Grameen bank; hence it made him more popular for the success.

In general, microfinance remain the only way to reach the poor, for example, according to (Lascelles et al., 2011) the microfinance industry is currently serving 150 million clients worldwide, of which is approximately 6% of the 2.7 billion people who still cannot afford the formal, traditional banking system. The aggressiveness of the microfinance industry to reach the 2.7 billion clients posit higher competition among MFIs (Lascelles et al., 2011). This intense competition is a result of readily available capital for MFIs to expand their services, the entry of commercial banks, which vested with knowing the end customers due to being in the financial industry and the leverage they have due to well established technology in the banking industry, (Lascelles et al., 2011).

2.2 CEOs labor market

The labor market force for CEOs in MFIs is not bulky. This is because, like in *for profit only* business corporations one may expect the external market force to play a role in reshaping the microfinance industry to have well qualified CEOs. This is not the case in MFIs, because, in *for profit only* business Corporations, the market force for CEOs characterised, for example, by takeover and mergers. In MFIs, the scenario is different. These forces have limited role because of different ownership of MFIs; hence, most MFs has no true owners (Hartarska, 2005, Mersland and Strøm, 2010). This has led into having weak governance in MFIs

² http://www.nobelprize.org/nobel_prizes/peace/laureates/2006/

characterised by poor management quality and staffing due to having insufficient qualified, resourceful and knowledgeable personnel (Lascelles et al., 2011, Mersland, 2009c).

Is CEOs in microfinance important? This is a serious and fascinating question for one reason: That is; shareholders, donors and prospective investors in MFIs are in constant search of capable and competent CEOs who can run the MFI profitably and reach more poor clients. Particularly the focuses of MFIs on social achievement and financial sustainability are of considerable concerns especially to stakeholders. Also, great concerns by the public at general is that of reaching poorer clients strata especially women customers who has empirically shown to have fewer loans defaults (for example see D'Espallier et al., 2011). Another concern is that of remaining financially sustainable or commercially viable in the perspective of donors and shareholders of the MFIs so that they can earn the return and continue to serve the poor (e.g. Hermes and Lensink, 2011, Hermes et al., 2011). Also, the data for business education and business experience of CEOs are one of the publicly available, which make possible for this study to investigate the influence of these characteristics on MFIs performance.

CHAPTER THREE: THEORIES AND RESEARCH HYPOTHESES

This chapter discusses the empirical evidence from past research on CEOs formal business education, business experience and firm performance. It draws literature from both microfinance and international business research in order for better understanding the influence of CEOs formal business education and business experience on MFIs performance. The empirical evidence is followed by discussion of theoretical background of resource based view theory and upper echelon theory. The conceptual framework covers the last section of this chapter.

3.1 Overview of empirical evidence from past research

Education and Experience of CEOs are one of the criteria that considered when hiring a CEO (Mackey, 2008, Gwin, 2011, Magnusson and Boggs, 2006, Sow Hup, 2010). The focus is on whether such attribute has an impact on firm performance. To study CEO experience and firm performance (Guthrie and Datta, 1997) studied a sample of 214 CEO. Their results indicate that experience of CEO has a positive relationship with firm performance. Another study by (Soriano and Castrogiovanni, 2012) who studied sample of 2,713 SMEs within European Union, they found that CEO experience has a positive influence on firm productivity but not profitability. The productivity measured based on revenue per employee.

Using a sample of 393 CEOs (Slater and Dixon-Fowler, 2009) CEOs international assignment experience positively related to the corporate social performance. Also, (Daily et al., 2000) studied sample of CEOs from fortune 500 on the influence of CEO international experience on firm performance. They found that there is a strong, positive relationship between CEO experience and firm performance.

The owners or founders of firms considered to have experience in managing their business. Empirical evidence by (Mersland. et al., 2011) who studied the impact of CEO founders in microbanks using 286 microbanks in 73 developing countries for the period of 10 years. Their main argument for their study was that founder CEO has tremendous interest of ownership in the firm; hence they are better manager and have competencies. This is in support with the finding by (Soriano and Castrogiovanni, 2012) where they found that CEO-owner firm has better management hence they have better performance. In their finding, they concluded that microbanks managed by founder CEOs have better management. That is they exhibit higher growth, fewer loans defaults (PaR30) and lower cost of operation.

The study by (Laveren et al., 2011) investigated CEOs experience on 511 sample of small firms. They found that experience contribute to growth of firm up to a certain level after

which experience does not contribute to growth. They found that growth rate lessens as the age of CEO increases. Another study done by (Stone and Tudor, 2005) on CEO experience and firm performance, they surveyed 58 CEOs in publicly traded corporations. Their result shows that CEO experience has a positive relationship with return on assets (ROA).

To study the influence of CEO education on firm performance (Gottesman and Morey, 2006) studied whether the better education for CEOs has an impact on firm performance. Better education compared based on those CEOs who attended prestigious school and those from less prestigious school. They found that there is no difference in firm performance between those firms managed by CEO with MBA and those firms managed by CEOs without a graduate degree. Furthermore, they found that there was no difference in performance of firm between those managed by CEOs from the prestigious school and those from less prestigious school. That is they found that there is the negative relationship between CEO from the prestigious school and firm performance.

To study the influence of CEO educational background on firm performance, (Gottesman and Morey, 2010) studied 390 US firms. Their question was whether better educated CEOs produce better firm financial performance. They examined the undergraduate degree CEO holds and, whether CEO has MBA or law degree or other degrees. They also controlled for industry effects. Their findings show that education background of CEO is not related to firm financial performance. Further their results indicated that CEOs with MBA or law degree does not outperform CEO without a graduate degree. Their main argument for the results was that MBA program concentrate much on quantitative-based, analytical skills rather than developing leadership and relational expertise that are essential for attainment of high level of managerial cadre.

The study by (Bhagat et al., 2010b) on CEO education and firm performance based on the role played by education in replacing new CEO and the subsequent effect of education on firm performance. They used more than 2,600 cases of CEO for the period of 14 years. To measure CEO education, they set criteria of whether the CEO attended top twenty undergraduate schools, whether the CEO has MBA or law master degree and whether the master degree is from the top twenty programs. They found that education does not play a role in replacing a poorly performing CEO, as they replace without due consideration of their education background. On the other hand, they found that, in case of new CEO who is replacing a poorly performing, CEO education play a significant, notable, role as there is a positive correlation for the new CEO and the one they replace. In case of firm performance with CEO education background, they found that MBA degrees have a positive impact in

short-term financial performance of the firm. However, they found that there is no significant relationship between CEO education and long term financial performance of the firm. Their conclusion was that CEO education does not reflect ability.

Also, (Slater and Dixon-Fowler, 2010) studied the impact of CEO education on corporate environmental performance. They investigated by testing empirically 416 S&P 500 CEOs. They studied CEO particularly with MBA education, which measured it, as categorical variable. The environment impact measured by looking on the firm activities adhere to environmental regulations. Their results showed that there is a positive relationship between CEO MBA education and corporate environment performance.

In MFI, the empirical evidence literature on CEO formal business education and experience influence on MFI performance is few and limited; the only available literature known to the author is that of CEO founder, CEO gender and CEO duality of chair/CEO position.

In microfinance, gender has influence in MFIs performance. An empirical research by (Strøm. et al., working paper), studied among other things the influence of female as CEO in MFIs performance and governance. They used data from 379 microbanks in 73 countries. In their study, they found that female CEO has a positive impact on financial performance but not on governance. Similarly, (Mersland and Strøm, 2009b) using data from 60 countries covering 278 MFs in the year between 2000 to 2007; they found the same results which shows that financial performance of MFI improves when the CEO is female. The conclusion for both studies on the positive impact for female CEO on MFI performance is due to female leadership, which is associated with more female customers, (Strøm. et al., working paper, Mersland and Strøm, 2009b) This attribution is in consistent with the current trend where there is an emphasize of empowering women through loans (Mayoux, 2010). For example, the study by (D'Espallier et al., 2011) concluded that female client have fewer loans defaults.

Duality of CEO in MFI studied by (Hartarska and Mersland, 2009) found that when CEO position is same with board chairmanship, the MFI become less efficient. This may cause monitoring by the board of directors to become less effective. Similarly, study by (Galema et al., 2012) using 280 MFIs from 60 countries with data from 2000 to 2007 they found that powerful CEO in MFI is associated with higher performance variability. In their study, they considered the powerful CEO in MFI is the one who has dual positions, that is CEO/Chairman. They argued further that performance variability is driven by the CEO managerial discretion, of which is prevalent only when there are no stakeholder electives on board.

3.2 Theoretical Background

This section discusses the theoretical framework of resource based view theory and upper echelon theory. It explains the theory and applicability of these theories in determining the influence of CEO formal business education, business experience on MFIs performance.

The resources based view theory argues that collections of resources within firm enables it to have unique attributes and hence better performance (Barney, 1991, Penrose, 1959). The resources for the firm include individual and group resources. The group resources include organisational resources, physical resources and human resources (Barney, 1991). The human resources categories include education and experience (Barney, 1991). Empirical evidence based on the resource based view theory found that higher education of CEO is associated with sales growth and, experience is associated with firm growth rate (e.g. Rajagopalan and Datta, 1996). This shows that formal education and experience of CEO has influence in firm performance, and this study argues that it is applicable also for CEOs in MFIs. Past literatures in both international business and MFIs emphasize the importance of resources and competence such as experience, managerial capability and education background of an employee within firm (e.g. Peteraf, 1993, Hall, 1992, Barney et al., 2011, Galema et al., Forthcoming, Foss, 2011). These are crucial to firm as they translate into firm performance (Peteraf, 1993, Wernerfelt, 1984).

Upper echelons theory explains the relationship between managerial characteristics and organisational outcome. It predicts that the performance of firm partially determined by managerial characteristics, which are observable, particularly formal education and experience (Hambrick and Mason, 1984, Holger et al., 2009, Carpenter and Sanders, 2004). The CEO as part of the top management team, their observable demographic profiles are associated with better firm performance (Troy et al., 2011, Li and Tang, 2010, Wang et al., 2011, Ng and Sears, 2012, Louis et al., 2010, Hambrick and Mason, 1984, Holger et al., 2009, Buyl et al., 2011). CEO education and experience are useful during strategic decision making because they act as indicators in determining firm performance (Wang et al., 2011, Ng and Sears, 2012, Waldman et al., 2004, Hambrick and Mason, 1984).

Recently, the Upper Echelons theory empirically used to study CEO education, experience and firm performance, as their empirical evidence shows that CEO education and experience are associated with better firm performance (Li and Tang, 2010, Slater and Dixon-Fowler, 2009, Ng and Sears, 2012, Koyuncu et al., 2010, Waldman et al., 2004, Mackey, 2008, Carmeli et al., 2011, Manner, 2010, Holger et al., 2009). I follow this trend of literature and

argue that CEO formal business education and business experience have influence in MFI performance.

3.3 Conceptual framework and research hypotheses

This section presents the hypotheses based on empirical evidence from past literature and theoretical background. The conceptual framework draws the hypothesized relationship between the CEO characteristics (education and experience) and MFI financial and outreach performance.

The CEO formal business education literatures in international business argues that education serve as cognitive ability of CEO in understanding the business environment where the firm operate (Bhagat et al., 2010b, Martelli and Abels, 2010, Hansen et al., 2010, Barker and Mueller, 2002, Bhagat et al., 2010a, Gitsham, 2011, Jalbert et al., 2011, Dreher and Ryan, 2001). To link this characteristic with firm performance education classified into different categories like business education, law and engineering (Rajagopalan and Datta, 1996, Jalbert et al., 2011, Martelli and Abels, 2010, Slater and Dixon-Fowler, 2010, Doms et al., 2010, Goh et al., 2008).

Of all the education discipline, business education is popular among CEOs in the firm as it has formal training on the way to manage business successfully (Hansen et al., 2010, Dreher and Ryan, 2001, Slater and Dixon-Fowler, 2010, Pfeffer, 2004, David and David, 2011).

Empirical evidence shows that firm with CEOs with formal business education had their firm performance ranks higher than firm with CEO without formal business education (Hansen et al., 2010, Pfeffer, 2004). This study argues that this also is applicable in MFIs. That is MFIs with CEO with formal business education have better performance compared to MFIs with CEO without formal business education.

From resource based view theory, CEO formal business education is regarded as human resource, which nurture basic, understanding for the CEO to have the ability in terms of knowledge to influence performance (Roth, 1995). From the upper echelon theory, CEO formal business education and the strategic choices act together to determine firm performance (Hambrick and Mason, 1984). This also expected in MFIs, where CEO with formal business education has increased financial performance compared to MFIs with CEO without formal business education. In case of outreach, MFIs with CEOs with formal business education reach more poor clients. Basing on the above arguments it is apparent that;

Hypothesis 1a: MFIs with CEO with formal business education have better financial performance compared with MFIs with CEO without formal business education

Hypothesis 1b: MFIs with CEO with formal business education have better outreach performance compared with MFIs with CEO without formal business education

The CEO business experience held as the top cognitive ability of CEO when it comes to fulfilling their duties (Rajagopalan and Datta, 1996, Zhang and Rajagopalan, 2010). CEOs with experience possess general knowledge, and it reflects their functional background of specialization (Laveren et al., 2011, Herrmann and Datta, 2006, Slater and Dixon-Fowler, 2009, Ryan and Wang, 2011, Koyuncu et al., 2010, Elsaid et al., 2011). The functional background includes whether the CEO has previous experience in management of business, has previous international experience or number of years in a managerial position as CEO (Carpenter et al., 2001, Musteen et al., 2006, Troy et al., 2011, Reed and Reed, 1989, Ryan and Wang, 2011, Stanley, 2011, Peter and David, 2006, Bigley and Wiersema, 2002b). Hence, with business experience CEOs has a better understanding of various business scenario for, example, how to manage resources within firm (Mendelson, 2011, Lascelles et al., 2011).

The newness of MFIs requires the CEO to be well knowledgeable with the customers it serves (Lascelles et al., 2011, Sow Hup, 2010). This is because the MFIs serve customers who are poor and there is a possibility of higher transactions costs and risk. The CEO with business experience can handle this situation especially in this period where there are diverse influences. Of recently MFIs the current trends for, example, innovations in the microfinance industry, growing concern to the lending methodologies and ownership of MFIs (Mersland and Strøm, forthcoming, Rahman and Nie, 2011, Valadez and Buskirk, 2011b, Hoque et al., 2011, Byström, 2008, Mersland and Strøm, 2010, Mersland, 2009b).

Empirical evidence finds that CEO with business experience have better firm performance compared with firm without business experience (Reed and Reed, 1989, Laveren et al., 2011, Eubanks, 1992, Herrmann and Datta, 2006, Slater and Dixon-Fowler, 2009, Ryan and Wang, 2011, Elsaid et al., 2011, Stanley, 2011). This study argues that it is also applicable in MFIs (Hartarska and Mersland, 2009).

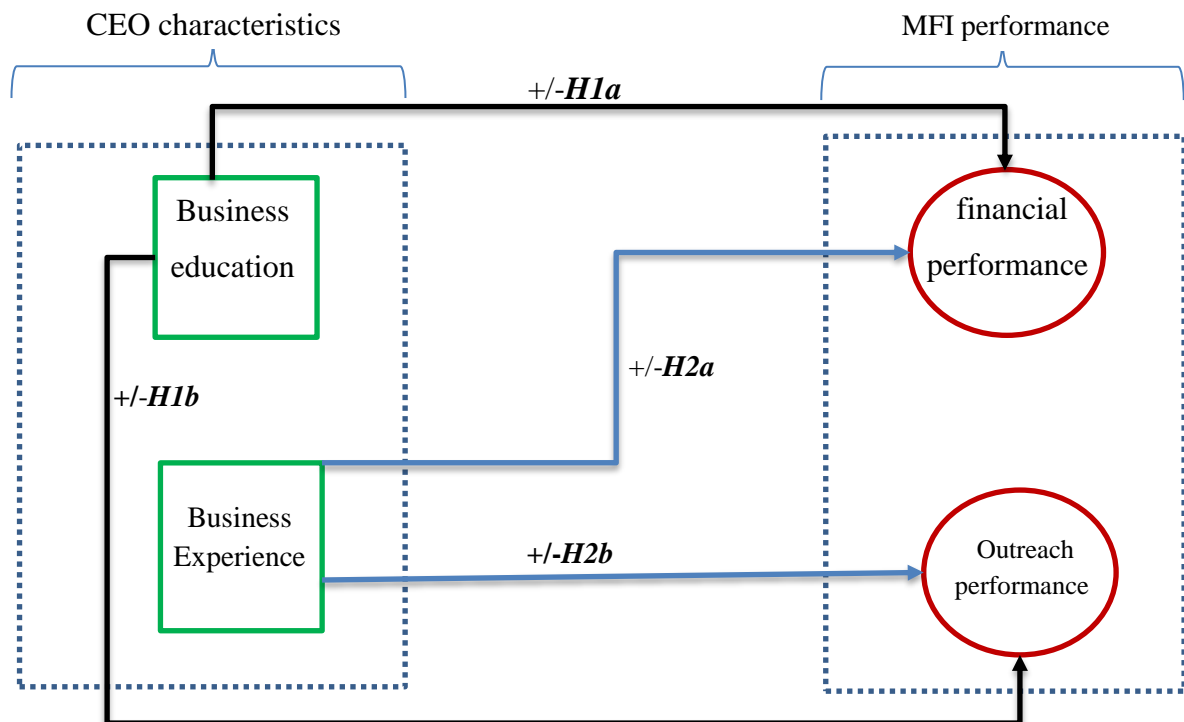
The arguments from the resource based view theory contends that business experience enable the CEOs to deploy their know how in MFI to drive better performance. The upper echelon theory contends that CEO with experience has a better understanding of strategic choice that has influences on MFI performance. This study argues that MFIs with CEO with business experience have better performance. Therefore, I hypothesize that

Hypothesis 2a: MFIs with CEO with business experience have better financial performance compared with MFIs with CEO without business experience.

Hypothesis 2b: MFIs with CEO with business experience have more outreach performance compared with MFIs with CEO without business experience.

The conceptual framework took into considerations of the resource based view theory, which regards CEOs in human resources perspective as the resources having business experience and business education to drive firm performance. The upper echelons theory regards the CEOs business education and business experience as characteristics which influence firm performance (Hambrick and Mason, 1984, Barney, 1991). Given the above argument, following is the conceptual framework in figure 3-1.

Fig 3-1 Conceptual Framework



Source: Author own constructs

CHAPTER FOUR: RESEARCH METHODOLOGY

This chapter presents source of data, the procedures used in gathering data and data validity and reliability in general. The measurements of concepts used in the study and the conceptual model applied in this study. The data analysis approach, managing omitted variable bias and econometrics analysis. The assumptions of multiple regression analysis, the issue of instrumental variable approach and the choice between fixed effect model (FEM) and random effect model (REM).

4.1 Data and sample

This study uses data from rated MFIs (Mersland et al., 2011) This dataset consists of 403 MFIs gathered in 74 countries. Table 4-1 in the next page shows the list of countries and number of MFIs. The information for this data was extracted from www.ratingfund2.org, a publicly available website. The dataset information's in the www.ratingfund2.org are from the five rating agencies risk assessment reports that include MicroRate, Microfinanza, Planet Rating, Crisil and M-Cril. The rating agencies were selected based on approval by the Rating Fund of the Consultative Group to Assist the Poor (Mersland et al., 2011) and are the leading five players in the rating of MFIs, and their rating report contains most of MFIs information. The methods use the rating agencies to assess MFIs are almost similar and there is no difference found.

This study is not the only one using dataset from rating report to write a master thesis. There are several others studies written based on rating agencies reports (e.g. Mersland, 2009a). Also, there are several articles in different journals written based on extracting information from rating report (e.g. Galema et al., 2012) used extracted information from rating report to study sample of 280 MFI, which its finding recently published in Journal of Management Studies. Therefore, the quality of information from the source is well recognised in the academics.

Sample selection procedures considered inclusion of sample in the dataset based on only rated MFIs. This is because most of the rated MFIs are the one able, and willing to be rated and had most of the rating categories being represented in the data. This helped to eliminate the background noise.

The missing data account for 25% in overall, and it varies from 0% for some variables and to above 70% to other variables. The effect has been accounted for by using STATA.

Table 4-1 List of countries and number of microfinance institutions

Number	Country Name	Number of MFIs	Number	Country Name	Number of MFIs
1	Albania	3	38	Romania	1
2	Argentina	1	39	Russian Federation	15
3	Armenia	3	40	Senegal	10
4	Benin	9	41	South Africa	3
5	Bolivia	15	42	Sri Lanka	1
6	Bosnia Hercegovina	12	43	Tanzania	5
7	Brazil	13	44	Togo	4
8	Bulgaria	2	45	Trinidad and Tobago	1
9	Burkina Faso	4	46	Tunisia	1
10	Cambodia	13	47	Uganda	10
11	Chile	2	48	Montenegro	2
12	Colombia	6	49	Cameroun	5
13	Dominican Republic	4	50	Guinee	1
14	Ecuador	18	51	East Timor	1
15	Egypt	5	52	Bangladesh	2
16	El Salvador	6	53	Nepal	5
17	Ethiopia	10	54	Vietnam	1
18	Georgia	6	55	Azerbaijan	7
19	Guatemala	6	56	Mongolia	2
20	Haiti	3	57	Nigeria	3
21	Honduras	8	58	Mozambique	1
22	India	32	59	Tajikistan	7
23	Indonesia	2	60	Croatia	1
24	Jordan	3	61	Chad	1
25	Kazakhstan	4	62	Rwanda	4
26	Kenya	9	63	Zambia	1
27	Kyrgyzstan	4	64	China	1
28	Madagascar	2	65	Serbia	1
29	Mali	3	66	Ghana	4
30	Mexico	18	67	Malawi	1
31	Moldova	2	68	Gambia	1
32	Morocco	6	69	Kosovo	4
33	Nicaragua	13	70	Rep of Congo Brazzaville	1
34	Pakistan	1	71	Burundi	1
35	Paraguay	2	72	Niger	3
36	Peru	32	73	DRC - Kinshasa	1
37	Philippines	7	74	Zambia	1
Total Number of MFIs					403

Source: Author owns constructs from MFIs panel dataset 2001 to 2009

4.2 Operationalization and measurement of concepts

According to (Sager, 1976) the operational definition or research definition is the definition of the concept which its properties or operations can be measured through observation. For

non-observable operational definition, their events, presence or absence behavior can be measured by inferring to the behaviour that can be observed. This study operationalizes the following concepts based on the theories. This study uses dependent variables comprises of adjusted return on assets (AROA) and portfolio at risk for 30 days (PaR30) to measure financial performance, and average loan size, percentage of women clients and credit clients to capture outreach performance. The independent variables are CEO with formal business education and CEO with business experience. I also use set of control variables. The following sections explain each of these variables, and at the end, a table of summary with explanations of the way measured each variable is presented.

The concept of education measured by (Soriano and Castrogiovanni, 2012) based on the formal business education acquired at the university either undergraduate or graduate courses. Similarly, education measured by (Gottesman and Morey, 2010) based on MBA. This measure implies business education, and in this study education uses as an independent variable in determining its influence on MFI performance. Particularly, education measures as university level undergraduate or graduate in business, banking, accounting, management, and economics and similar. It assigns 1 if CEO has formal business education or 0 if CEO does not have formal business education.

The concept of experience defined by (Begley and Boyd, 1985, Dyke et al., 1992, Stuart and Abetti, 1990) as the total time the CEO has been in that position or the time has been with the firm, previous years in management of business and ownership. To measure the concept of experience (Sandberg and Hofer, 1987) uses dummy to indicate the presence or absence of business experience. This study uses experience as an independent variable in determining its influence in MFI performance. Experience used as business experience where CEO has either ownership or management of business prior to becoming the CEO and if the CEO is hired within the MFI. This study assigns 1 if CEO has business experience or 0 if CEO does not have business experience.

Control variables used in this study includes MFI specifics control variables and country control variables to minimize the possibility of associating the influence of independent variables for which they are not responsible for the change in the dependent variable (Hair, 2010, Zikmund et al., 2010). This study uses control variables recently used in MFI literature (Galema et al., 2012, Mersland et al., 2011). It includes MFI experience, which indicates the number of years that the MFIs have been in operation. MFI size assessed by the amount of assets it owns and used as the natural logarithm. Regulation, which shows if the MFI is included in the formal banking regulation of which according to (Galema et al.,

2012) regulated act as hints for loan provider, as a trust to the MFI itself and, indicates the MFI follow the formal institutions of the jurisdictions they operate. Competition means local level of MFI competition. HDI means human development index which control country specifics like institutions and differing background (Mersland and Strøm, 2009a) Also, this study uses regional dummies for Asia, Latin America, Africa, Middle East and Eastern Europe. The following table 4-2 below summarise all the independent variables and control variables.

Table 4-2 Explanations of independent and control variables

Independent variables	Explanation (measure)	Hypothesis	
		Financial (AROA, PaR30)	Outreach (Average loan size, Percentage women clients and credit clients)
CEO formal business education	A dummy with value of 1 if CEO has business education	+/-	+/-
CEO business experience	A dummy with value of 1 if CEO has business experience	+/-	+/-
Control variables			
MFI size	logarithm of MFI total asset		
MFI age	Number of years since the establishment		
Competition	A self-constructed measure of the local level of competition where 1 mean little or no competition and 7 high competition		
Regulation	A dummy with value of 1 if the MFI is regulated by banking authority		
Regional	A dummies for Latin America, Africa, Middle East and Eastern Europe		
Human Development Index (HDI)	An index ranking for each country covering health, education and income (GDP per capita in PPP terms (constant 2005 international \$)) ³		

MFI's have dual objectives hence their performance is captured based on financial performance and outreach performance (Mersland and Strøm, 2009b). I measure financial performance using return on assets (profitability) and portfolio quality (PaR30).

I use adjusted return on assets (*aroa*) to measure MFI's profitability. I adjusted for inflation ($aroa - inflation$) / $(1 + inflation)$. It measures the extent which the MFI's uses its assets to generate return, that is $ROA = \frac{net\ operating\ income}{average\ annual\ assets}$ (Galema et al., 2012). This

³ Source <http://hdr.undp.org/en/data/build/> as also used by MERSLAND, R. & STRØM, Ø. R. 2009a. Performance and governance in microfinance institutions. *Journal of Banking & Finance*, 33, 662-669.

measure was used in (Mersland. et al., 2011 pp. 19) to capture the overall financial performance in MFIs industry as they argued that due to differing organisational forms of MFI where others are owned, others are without owners and differing objectives as others are after profit while others are not for profit. The effect of this differing organisation form lead to differing debt/equity levels between MFIs, hence this make ROA to be the best proxy measure for capturing financial performance than using return on equity (ROE).

To measure portfolio at quality this study uses a proxy measure of Portfolio at risk (PaR30) which shows the ability to collect loan. Furthermore, this measure can be regarded as a proxy for competence of management, because the loan repayment is a key to the survival of the MFI in order to continue serving other clients (D’Espallier et al., 2011, Mersland and Strøm, 2008).

Par30 is computed as;

$$\text{Portfolio } (\times \text{ days}) = \frac{\text{Outstanding principal balance of all loans past due more than } x \text{ days}}{\text{Outstanding principal balance of all loans}}$$

I use average loan size, percentage of women clients and number of credit clients to capture the depth of outreach performance (Mersland et al., 2011, Mersland and Strøm, 2009a).

I measure the average loan size as:

(gross outstanding portfolio)/(number of Active credit clients) (Galema et al., 2012 pp. 11).

The following table 4-3 below summarises the explanations of all dependent variables used in this study.

Table 4-3 Summary of dependent variables used in the study

Variable	Explanation (Measure)
Financial Performance/profitability	
AROA	Return on assets (ROA) at the end of a given period, Adjusted for inflation = $(\text{net operating income})/(\text{average annual assets})$
Par30	The fraction of the portfolio with more than 30 days in arrears
Outreach Performance	
Average loan size	Average loan size = $(\text{Gross outstanding portfolio})/(\text{Number of active credit clients})$
Women clients	Percentage of women clients
Credit clients	Number of credit clients

4.3 The conceptual model

The relationship between the dependent and independent variables in this study is explained using panel data model. The panel data is a set of data comprising recurring observations of the same individual (e.g. MFIs) collected over a number of periods e.g. years (Baum, 2006, Cameron and Trivedi, 2009, Gujarati and Porter, 2010, Johnston and DiNardo, 1997, Wooldridge, 2006). The panel data combine cross-section and time series data of the same individual collected over time (Gujarati, 2003).

Since the panel data provides a relationship, over time to individual (e.g. MFIs), this implies that these individuals are bound to be heterogeneous. The panel data estimation takes into considerations such heterogeneity by allowing individual-specific (MFI) variables to be tested (Studenmund, 2006).

Therefore, in the course of establishing a relationship between dependent and independent variables given a focus to individual characteristics of MFIs, such as MFIs country, MFI year of the report, MFI type and so on, a panel data was considered to be an appropriate tool. This is because; the panel data can measure and detect appropriately the effects that cannot easily be detected by using pure cross-sectional data or pure time series data (Gujarati and Porter, 2010, Johnston and DiNardo, 1997, Wooldridge, 2006). Furthermore, the panel data is flexible, it gives more information on data analysis, it has more variability; it has less collinearity among variables, and enhance efficiency (Gujarati, 2003 pp. 637). Following is a general panel data regression model (Bollen and Brand, 2010).

$$Y_{it} = \alpha_i + \beta' \times_{it} + \varepsilon_{it}$$

Where;

Y_{it} Represent the dependent variable (measure of financial sustainability and outreach) for cross-section unit i at time t , where $i = 1 \dots n$ and $t = 1 \dots T$

α_i Represent heterogeneity or an individual effect which comprises the constant term in the model, and it contain set of observable individual or group specific variables for example MFIs type, MFIs region and so on, or unobserved MFI characteristics (for example composition of governance mechanism within the MFIs) which are considered to not to vary over time (Wooldridge, 2006).

β Represent the partial effect measure of \times_{it} in time t for the unit i

\times_{it} Represent the j^{th} predictor variable for unit i at time t . In this study there are K predictor variables indexed by $j=1, \dots, K$ which means that \times_{it} is a K dimensional vector

ε_{it} Represent the error term

Operational models for the above general equations are presented in the linear regression section.

The presented previous model can be adapted for use either with fixed effect model or random effect model. The fixed effect model assumes that the individual effect of α_i is correlated with the predictor variable \times_{it} while the random effect model assume that the individual effect α_i is not correlated with the predictor variable \times_{it} hence, the error term in random effects become $(\mu_i + \varepsilon_{it})$, whereby μ_i is the specific random effects element for the group which is similar to ε_{it} except that with μ_i , for every group there is a single draw that is considered into the regression identically for each time (Gujarati and Porter, 2010, Wooldridge, 2006).

4.4 Data analysis approach

The data from the dataset were put together and in an acceptable format to enable inter-MFI comparison. Then, converted into the CSV (comma delimited) format, that enables transferring to STATA econometric software for analysis.

This study uses STATA for data analysis because it is enabling efficient and easy data analysis for researchers (Baum, 2006, Cameron and Trivedi, 2009). Furthermore, STATA software ability to analyse panel data in a range of time and units fits the purposes of this study, hence appropriate software for this study (Cameron and Trivedi, 2009). The STATA software also is user friendly and interactive to the researchers. The online technical support and abundance of learning resources available makes this software more convenient for uses in this study. Also one of its advantages over other statistical software packages is that it follows strict rules with its commanding syntax, for example in grammatical terms, there are few notable irregular verbs (Baum et al., 2011). Also, makes easy for panel data implementation in regression (Baum, 2006, Cameron and Trivedi, 2009). Lastly, it is convenient to use this software because the researcher is knowledgeable in use of this statistical software, and has a full time access to it.

4.5 Managing Omitted Variables Bias

With multivariate models, there is a possibility that the coefficient derived from regression analysis suffers from the omitted variable bias (Børing, 2010, Sessions and Stevans, 2006). This effect occurs when the models suffer from missing variable which has influence on the dependent variables, and this may lead into affecting the coefficients in the model which may be biased and hence misleading (Chamberlain, 1985). This requires controlling of the unobserved effects of these omitted variable (Kim and Frees, 2006). Following is the general equation model for unobserved effect (Wooldridge, 2006 pp. 251):

$$Y_{it} = X_{it}\beta + C_i + \mu_{it}$$

Where; $t = 1, 2, \dots, T$

X_{it} Is $1 \times K$ which may contain variables that;

- Vary across t but not i
- Vary across i but not t
- Vary across i and t

C_i Unobserved heterogeneity or individual effects or individual heterogeneity

μ_{it} The idiosyncratic errors as it vary across t as well as across i

Therefore, from the above equation, controlling for unobserved effects largely depends on the nature of the omitted variable, that is, whether is changing over time or is constant over time, and whether is changing over cases or is constant overs cases (Kim and Frees, 2006). This phenomenon sometimes known as time specific and unit (case) specific effect of the unobserved variable (Gujarati and Porter, 2010, Studenmund, 2006). From the econometric literatures, there are several methods for dealing with omitted variables. Two of these are fixed effects model and random effects model (Kim and Frees, 2006, Børing, 2010, Cameron and Trivedi, 2009, Gujarati and Porter, 2010, Johnston and DiNardo, 1997, Studenmund, 2006, Wooldridge, 2006).

The fixed effect model assumes that the constant term differences can capture the difference across cases or MFIs as used in this study. This allows the unobserved individual case effects to be controlled by correlating it with predictor variable (Gujarati and Porter, 2010, Studenmund, 2006, Wooldridge, 2006). This gets rid of the effects of the unobserved effects from the predictor variable, and, hence enables assessment of the predictors' net effect (Gujarati and Porter, 2010, Wooldridge, 2006). Hence, the changes in variables over time (given the result of unobserved effect of omitted variable), can be utilised when estimating the effect of predictor variables on the criterion variable. This makes the fixed effect model to

be suitable when one want to control for the omitted variable that differ across case (MFI) which exhibit constant variation over time (Baum, 2006, Johnston and DiNardo, 1997, Studenmund, 2006, Wooldridge, 2006, Kim and Frees, 2006). The random effect is appropriate when one want to control the omitted variable that is the same across case (MFI) but exhibit difference over time (Johnston and DiNardo, 1997, Studenmund, 2006, Wooldridge, 2006, Greene, 2012).

The advantage with the random effect is that it includes the unobserved heterogeneity, while in fixed effect it is absorbed by the intercept (Greene, 2012, Gujarati and Porter, 2010, Wooldridge, 2006). The disadvantage of the random effects is its assumption of uncorrelated relationship between the predictor variable with the unobserved effects. Many researchers think it as unrealistic assumptions. The unobserved heterogeneity usually correlates with the predictor variables (Baum, 2006, Børing, 2010, Greene, 2012, Kim and Frees, 2006, Stock and Watson, 2003). This assumption make the fixed effect model superior to random effect as it does not include such assumption (e.g. Sven and Daniel, 2007).

However, this has to be taken with precautions, because there is a scenario where the random effect is more appropriate to use. This is when the omitted variable effect differs across case but are constant over time (as the case with fixed effect model), and provided the omitted variable effect are constant but change over time (Greene, 2012, Gujarati and Porter, 2010). If the assumptions hold, the random effects estimator is more efficient since it allows identification of the intercept which is differenced out under fixed effects. Given the above arguments of fixed effect model and random effect model the researcher rely on the Hausman test (Hausman, 1978) to measure the appropriateness of each model assumptions for use in this study.

4.6 The Econometric analysis

This section discusses the econometric analysis approaches used in the study, this include, the correlation analysis, Multicollinearity, assumptions of multiple regression analysis, the choice between fixed effect model and random effect model.

I run correlation analysis using STATA to determine whether the variables correlate or not. However the results show the variables were correlated. The correlation analysis also helped to determine the extent of multicollinearity for the variables. The table below shows the correlation of the variables. From table 4-4 in the next page, it shows that the correlations coefficient for CEO business experience and business education is 0.3823.

Multicollinearity occurs when there is a high but not perfect correlation among the independent variables within the multiple regression models.

Table 4-4 Correlations analysis

Variables	1	2	3	4	5	6	7	8	9	10	
(1)CEO=Experience	1										
(2)CEO=Education	0.3823	1									
(3)MFI age	0.0554	0.1699	1								
(4)MFI size	0.0914	0.1579	0.2045	1							
(5)Regulation	0.0377	0.0927	0.0350	0.1459	1						
(6)Competition	-0.0603	0.0251	0.1965	0.2498	-0.026	1					
(7)Human Dev. Index	-0.0449	-0.107	-0.0879	-0.032	-0.317	0.0759	1				
(8)Latin America	0.0243	0.1166	0.1325	0.0368	-0.177	0.2718	0.3667	1			
(9)Africa	0.0687	0.1560	0.0481	0.0399	0.225	-0.152	-0.807	-0.379	1		
(10)Middle East	0.0516	0.0940	-0.1126	0.0794	-0.049	-0.162	0.0139	-0.16	-0.099	1	
(11)Eastern Europe	-0.0803	-0.223	-0.2823	0.0210	-0.017	-0.047	0.343	-0.398	-0.246	-0.1037	1

The results of high multicollinearity are contrary to the expectations for the independent variables to correlate with the dependent variables, and the problem is not on the model specification but it relates to the sample (Verbeek, 2012, Hair, 2010). This can cause in the decreases of the explanatory power information of the independent variables to the dependent variables and, hence may draw a wrong conclusion that the independent variables are not related to the dependent variables (Hair, 2010). With multicollinearity, the standard errors for the estimated regression coefficient are relatively large, but are not biased estimates (Greene, 2012, Verbeek, 2012).

The extent with which correlation can cause multicollinearity is not well set. Scholars in econometrics and statistics have difference view as to the cut-off in the correlation that could alarm existence of multicollinearity. In their book (Hair, 2010) argue that the cut-off point is 0.9 correlation coefficient of which below that there is no effect of multicollinearity. Others (Bagheri and Midi, 2009) argue that when the correlation coefficient exceed 0.9 then multicollinearity can be detected. Both authors have the same cut off point of 0.9 correlation coefficients. However, (Wooldridge, 2006) argue differently, he affirm that there is no absolute number to conclude that there is multicollinearity problem, the only hints that will tell that whether there is multicollinearity or not is when there is a high correlation between the overall sample variation (SST) and the respective individual variables variance (δ^2). This

study took an approach in assessing, determining the multicollinearity and applying the remedies thereof (Hair, 2010)

The correlation coefficient between the moderated effect of CEO business experience and business education is lower than the suggested cut off point of 0.9 (Hair, 2010). This correlations coefficient provides a hint of no problem of multicollinearity.

Furthermore, Multicollinearity can also be detected by calculating variance of inflation factor (VIF) for each coefficient. This test statistics is used as a diagnostic tool to detect the seriousness of multicollinearity problem (Mansfield and Helms, 1982). There is no consensus for cut-off point for VIF, for example (Hair, 2010, Gujarati, 2003, Curto and Pinto, 2011) argues that VIF above 10.0 means there is a multicollinearity problem while (Greene, 2003) argued that VIF below 20.0, there is no multicollinearity problem. Furthermore, (Hair, 2010) argue that the is 0.9 cut-off for tolerance value which corresponds to VIF of 10.0

The literature in econometrics lays down methods that can be used to handle multicollinearity problem in dataset. These are omit one or more variable suggested by (Hair, 2010) that is causing multicollinearity, do nothing, increase the sample size or just obtain more data as the problem may be corrected if the sample size is more than 100 observations (Gujarati, 2003, Gujarati and Porter, 2010, Verbeek, 2012). The problem can be corrected by doing variable transformation (Hair, 2010).

To see if there is a multicollinearity problem, variance of inflation factor (VIF) was calculated using collinearity diagnostic tool in STATA.

The results in table 4-5 in the next page, show that CEO business experience has the VIF value of 1.18 while CEO business education has VIF of 1.31, which implies that they both below the VIF value of 10 (Hair, 2010).

Table 4-5 Variance of Inflation Factor (VIF)

Variable	VIF	SQRT VIF	Tolerance	R-Squared
CEO=Business experience	1.18	1.09	0.8463	0.1537
CEO=Business education	1.31	1.15	0.7613	0.2387
MFI age	1.22	1.10	0.8201	0.1799
MFI size	1.20	1.10	0.8301	0.1699
Regulation	1.17	1.08	0.8548	0.1452
Competition	1.24	1.11	0.8066	0.1934
Human Dev. Index	3.67	1.92	0.2725	0.7275
Latin America	2.24	1.50	0.447	0.553
Africa	3.28	1.81	0.3046	0.6954
Middle East	1.29	1.14	0.7744	0.2256
Eastern Europe	2.15	1.47	0.4657	0.5343
Mean VIF	1.81			

The above table confirms that there is no multicollinearity. Moreover the sample size is large enough (403 cases) and the use of panel data analysis offer more options that lead to reduced multicollinearity problem (Mersland and Strøm, 2008).

The linear regression model used incorporated additive to cover the hypotheses and conceptual framework that established in this study. Hypothesis H1a, H2a on CEO characteristics and MFI financial performance linear regression equation 1 and 2. Linear regression equation 3, 4 and 5 tests H1b and H2b which is CEO characteristics and MFI outreach performance. The regression models were run with and without control variables. In order to interpret the results in a meaningful way; the models were tested for robustness. Following are the linear regression models;

- **CEO characteristics and MFI profitability**

$$AROA_{i,t} = \beta_0 + \beta_1 CEOBEXP_{i,t} + \beta_2 CEOBEDU_{i,t} + \beta_3 Controls_{i,t} + \mu_i + \varepsilon_{i,t} \dots\dots\dots (1)$$

Where;

$AROE_{i,t}$ = Return on assets for MFI i at time t , where $i=1 \dots n$ and $t=1 \dots T$

CEOBEXP = CEO business experience

CEOBEDU = CEO business education

Controls = control variables (MFI size, age, competition, HDI, bank regulation and region dummies)

μ_i Unobserved heterogeneity MFI specific effect

ε_{it} The idiosyncratic errors as it vary across t as well as across i

- **CEO characteristics and portfolio quality**

$$PaR30_{i,t} = \beta_0 + \beta_1 CEOBEXP_{i,t} + \beta_2 CEOBEDU_{i,t} + \beta_3 Controls_{i,t} + \mu_i + \varepsilon_{i,t} \dots\dots\dots (2)$$

Where;

$PaR30_{i,t}$ = Portfolio at risk with more than 30 days in arrears for MFI i at time t

- **CEO characteristics and MFI outreach**

$$Lsize_{i,t} = \beta_0 + \beta_1 CEOBEXP_{i,t} + \beta_2 CEOBEDU_{i,t} + \beta_3 Controls_{i,t} + \mu_i + \varepsilon_{i,t} \dots\dots\dots (3)$$

Where;

$Lsize_{i,t}$ = Average loan size for MFI i at time t

$$Wclients_{i,t} = \beta_0 + \beta_1 CEOBEXP_{i,t} + \beta_2 CEOBEDU_{i,t} + \beta_3 Controls_{i,t} + \mu_i + \varepsilon_{i,t} \dots\dots\dots (4)$$

Where;

$Wclients_{i,t}$ = Percentage of women clients for MFI i at time t

$$CrClients_{i,t} = \beta_0 + \beta_1 CEOBEXP_{i,t} + \beta_2 CEOBEDU_{i,t} + \beta_3 Controls_{i,t} + \mu_i + \varepsilon_{i,t} \dots\dots\dots (5)$$

Where;

$CrClients_{i,t}$ = Number Credit clients for MFI i at time t

4.7 Assumptions of multiple regression analysis

This section focuses in investigating whether the variables in the regression equation meets these assumptions (Hair, 2010). These assumptions need to be met for the regression model to precisely, predict the actual relationship among the variables (Hair, 2010). These are particularly necessary when estimating the regression coefficients and dependent variable prediction (Hair, 2010). The assumptions include linearity of the relationship between dependent variables and independent variables, constant variance of the error term, independence of the error terms and normality of the error term.

To test for Heteroscedasticity I use Breusch-Pagan test, which offer a test of a null hypothesis that there is no heteroscedasticity across the range of independent variables. The test results were not statistically significant ($p > 0.05$ for 5 percent significant level) for determinants of credit clients (CrClients), hence I failed to reject the null hypothesis. The test results were statistically significant for determinants of profitability (aroa), determinants of portfolio quality (PaR30), determinants of average loan size (Lsize) and, determinants of percentage of women clients (Wclients); hence I rejected the null hypothesis (See table 4-6 from page 26 to 27 for detailed results). The presence of unequal variance, made this study

run these regression models with constant error as suggested by econometrics literature (Greene, 2012, Studenmund, 2006, Verbeek, 2012).

Table 4-6 Breusch-Pagan tests for heteroscedasticity

Determinants of profitability (AROA)

```
. hetttest
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of aroa

chi2(1) = 10.36

Prob > chi2 = 0.0013

Determinants of portfolio quality (PaR30)

```
. hetttest
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of PaR30

chi2(1) = 89.88

Prob > chi2 = 0.0000

Determinants of average loan size (Lsize)

```
. hetttest
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of Lsize

chi2(1) = 1819.38

Prob > chi2 = 0.0000

Determinants of percentage of women clients (Wclients)

```
. hettest
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of wclients

```
chi2(1)      =      3.07  
Prob > chi2  =      0.0798
```

Determinants of credit clients (CrClients)

```
. hettest
```

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

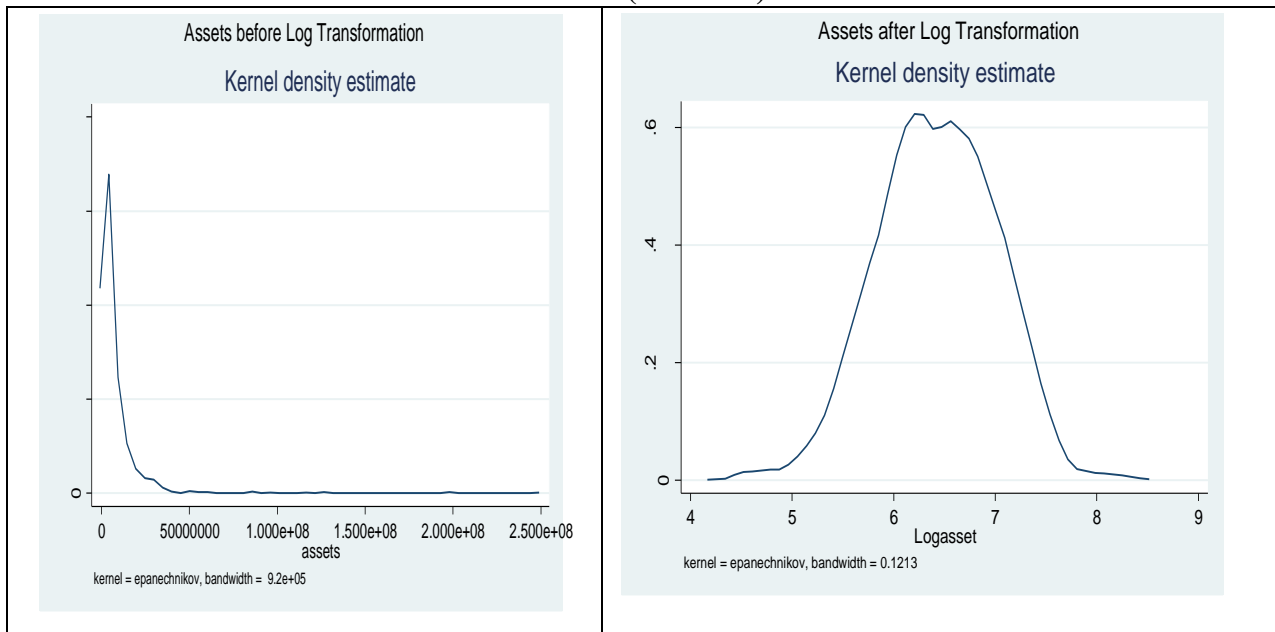
Ho: Constant variance

Variables: fitted values of crclients

```
chi2(1)      =     500.44  
Prob > chi2  =      0.0000
```

To test the normality of the error term this study uses normal probability plot (Hair, 2010). The MFI size (assets) was not normally distributed. Hence a log transformation was computed and the results are shown in table 4-7 below.

Table 4-7 Transformation of variable assets (MFI size)



All other variables were normally distributed.

To test for autocorrelation of the error term I use Wooldridge test for autocorrelation in panel data which test the null hypothesis that there is no first order autocorrelation (see table 4-8 below for detailed information). The test results for determinants of credit clients (CrClients) were not significant ($p < 0.05$ for 5 percent significant level), hence I failed to reject the null hypothesis.

Table 4-8 Wooldridge test for autocorrelation in panel data

```
. xtserial aroa CEOBEXP CEOBEDU `controls'

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
      F( 1,      83) =      44.790
      Prob > F =      0.0000

. xtserial PaR30 CEOBEXP CEOBEDU `controls'

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
      F( 1,     120) =     15.602
      Prob > F =      0.0001

. xtserial Lsize CEOBEXP CEOBEDU `controls'

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
      F( 1,     123) =     63.750
      Prob > F =      0.0000

. xtserial wclients CEOBEXP CEOBEDU `controls'

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
      F( 1,       1) =    275.552
      Prob > F =      0.0383

. xtserial CrClients CEOBEXP CEOBEDU `controls'

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
      F( 1,     123) =      0.020
      Prob > F =      0.8885
```

The test results for determinants of profitability (aroa), determinants of portfolio quality (PaR30), determinants of average loan size (Lsize) and determinants of women clients (Wclients) were all statistically significant ($p < 0.05$ for 5 percent significant level); hence rejected the null hypothesis. The presence of first order autocorrelation, made this study run the regression model with standard error as suggested in econometrics literature (Gujarati and Porter, 2010, Stock and Watson, 2003).

4.8 Instrumental variable approach

The objective of this study was to examine the effects of CEO characteristics (CEO formal business education and business experience) on performance of MFIs. Given the causal relationship I predicted, sometimes the MFIs may influence the CEO characteristics. Its influence can emanate from being big or having better both financial and outreach performance. This may lead into recruiting well educated (in the area of business education) and well experience (in the area of business experience). Under such situation MFI performance and CEO characteristics depends on each other (Marra and Radice, 2011). This relationship creates a causal relationship to be on both directions, a problem which is called endogeneity of the independent variables which is the main focus of the study in predicting the dependent variable (Marra and Radice, 2011). If such situation exist it requires use of simultaneous equations models (Gujarati, 2011, Gujarati and Porter, 2010).

The solution to such a situation is the use of instrumental variables approach as suggested in the econometrics literature (e.g. Wooldridge, 2006). This method provides consistent outcomes and is applicable in all form of analysis (Johnston and DiNardo, 1997, Studenmund, 2006, Wooldridge, 2006). This offers a means by which it is possible to get consistent estimator for when the predictor variables that are correlated with the error term (Stock and Watson, 2003). To test the existence of endogeneity between CEO characteristics and MFIs performance, I run instrumental variable two-stage least squares (2SLS) estimation to obtain the Wu-Hausman F test and Durbin-Wu-Hausman chi-sq test for each regression equation (Masaaki et al., 2011).

Table 4-9 testing for endogeneity results

$AROA_{i,t} = \beta_0 + \beta_1 CEOBEXP_{i,t} + \beta_2 CEOBEDU_{i,t} + \beta_3 Controls_{i,t} + \mu_i + \varepsilon_{i,t}$			
Tests of endogeneity of:		CEOBEDU	CEOBEXP
H0: Regressor is exogenous			
Wu-Hausman F test:	P-value	0.30551	0.44793
Durbin-Wu-Hausman chi-sq test:	P-value	0.29915	0.44158

$PaR30_{i,t} = \beta_0 + \beta_1 CEOBEXP_{i,t} + \beta_2 CEOBEDU_{i,t} + \beta_3 Controls_{i,t} + \mu_i + \varepsilon_{i,t}$			
Tests of endogeneity of:		CEOBEDU	CEOBEXP
H0: Regressor is exogenous			
Wu-Hausman F test:	P-value	0.05652	0.07016
Durbin-Wu-Hausman chi-sq test:	P-value	0.05486	0.06814

$Lsize_{i,t} = \beta_0 + \beta_1 CEOBEXP_{i,t} + \beta_2 CEOBEDU_{i,t} + \beta_3 Controls_{i,t} + \mu_i + \varepsilon_{i,t}$			
Tests of endogeneity of:		CEOBEDU	CEOBEXP
H0: Regressor is exogenous			
Wu-Hausman F test:	P-value	0.0748	0.9741
Durbin-Wu-Hausman chi-sq test:	P-value	0.0739	0.9740

$Wclients_{i,t} = \beta_0 + \beta_1 CEOBEXP_{i,t} + \beta_2 CEOBEDU_{i,t} + \beta_3 Controls_{i,t} + \mu_i + \varepsilon_{i,t}$			
Tests of endogeneity of:		CEOBEDU	CEOBEXP
H0: Regressor is exogenous			
Wu-Hausman F test:	P-value	0.10264	0.36225
Durbin-Wu-Hausman chi-sq test:	P-value	0.09645	0.34879

$Crclients_{i,t} = \beta_0 + \beta_1 CEOBEXP_{i,t} + \beta_2 CEOBEDU_{i,t} + \beta_3 Controls_{i,t} + \mu_i + \varepsilon_{i,t}$			
Tests of endogeneity of:		CEOBEDU	CEOBEXP
H0: Regressor is exogenous			
Wu-Hausman F test:	P-value	0.23105	0.85277
Durbin-Wu-Hausman chi-sq test:	P-value	0.22503	0.85051

From the results in tables 4-9, I tested the null hypothesis that the Regressor (either CEOBEDU or CEOBEXP) is exogenous. All the P-values are higher than 5 percent (P>0.05 at 5% significant level). Therefore, I fail to reject the null hypothesis in all case that the Regressor is exogenous. Hence I conclude that CEO business education (CEOBEDU) and CEO business experience (CEOBEXP) are all exogenous variables in the regression equations uses to evaluate the model.

4.9 The choice between fixed effect model or random effect model

The use of panel data model allows using either the fixed effect models or random effect models to estimate the dependence relationship among the variables, while taking care of the issue of omitted variables. The decision of whether to use fixed effect or random effect models was made based on the results of Hausman test as suggested in the econometrics literature (Baum, 2006, Chamberlain, 1985, Stock and Watson, 2003, Verbeek, 2012, Wooldridge, 2006). Table 4-10 shows detailed results for the Hausman test and table 4-11 shows summarised results for the choice of the model.

Table 4-10 Hausman test

Determinants of profitability (AROA)				
. hausman fe re				
	Coefficients		(b-B)	sqrt(diag(V_b-V_B))
	(b)	(B)	Difference	S.E.
	fe	re		
Competition	-.015015	.0042918	-.0193068	.0290122
Regulation	-.2169349	-.0615208	-.1554141	.1033061
hdi	-2.210625	.0475361	-2.258161	1.938425
MFIage	.0420736	.0016794	.0403943	.0174841
MFIsize	-.1111447	.0568407	-.1679853	.0989882
LatinA	-.032546	-.0354563	.0029103	.1259948
b = consistent under Ho and Ha; obtained from xtreg B = inconsistent under Ha, efficient under Ho; obtained from xtreg Test: Ho: difference in coefficients not systematic $\text{chi2}(6) = (b-B)'[(V_b-V_B)^{-1}](b-B)$ $= 8.60$ Prob>chi2 = 0.1971				
Determinants of Portfolio quality (PaR30)				
. hausman fe re				
	Coefficients		(b-B)	sqrt(diag(V_b-V_B))
	(b)	(B)	Difference	S.E.
	fe	re		
Competition	-.0146404	.0008625	-.0155029	.0164937
Regulation	.0020437	.0167473	-.0147037	.0189982
hdi	.3445742	-.0495416	.3941159	1.789824
MFIage	.0035804	.0027212	.0008592	.009701
MFIsize	-.0314872	-.038391	.0069038	.0655606
LatinA	.0361179	.0201253	.0159925	.1203207
b = consistent under Ho and Ha; obtained from xtreg B = inconsistent under Ha, efficient under Ho; obtained from xtreg Test: Ho: difference in coefficients not systematic $\text{chi2}(6) = (b-B)'[(V_b-V_B)^{-1}](b-B)$ $= 1.43$ Prob>chi2 = 0.9642				

Determinants of average loan size (Lsize)

. hausman fe re

	Coefficients		(b-B) Difference	sqrt(diag(v_b-v_B)) S.E.
	(b) fe	(B) re		
Competition	.0160854	-.0135836	.029669	.0834212
Regulation	.0511063	.1250261	-.0739198	.0417709
hdi	-5.123757	.3672725	-5.491029	7.910399
MFIage	-.0371241	-.0064502	-.0306739	.0403167
MFIsize	.1073759	-.2989781	.406354	.2485243
LatinA	-.2667962	.5465986	-.8133949	.3971688

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

Test: Ho: difference in coefficients not systematic

chi2(6) = (b-B)'[(v_b-v_B)^(-1)](b-B)
 = 5.28
 Prob>chi2 = 0.5080
 (v_b-v_B is not positive definite)

Determinants of percentage of women clients (Wclients)

. hausman fe re

	Coefficients		(b-B) Difference	sqrt(diag(v_b-v_B)) S.E.
	(b) fe	(B) re		
Competition	-.0086884	.0052816	-.01397	.0168393
Regulation	-.0237408	-.0179774	-.0057634	.0042089
hdi	2.815781	1.13776	1.678022	1.069967
MFIage	-.0036629	.0022717	-.0059346	.0310397
MFIsize	.0150331	-.0177035	.0327366	.1175202

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

Test: Ho: difference in coefficients not systematic

chi2(5) = (b-B)'[(v_b-v_B)^(-1)](b-B)
 = 8.17
 Prob>chi2 = 0.1472
 (v_b-v_B is not positive definite)

Determinants of credit clients (CrClients)				
. hausman fe re				
	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe	(B) re		
Competition	-1811.413	-330.204	-1481.209	1368.395
Regulation	-3524.48	-2645.105	-879.3746	1350.661
hdi	47561.51	-59798.61	107360.1	159570.8
MFIage	376.4987	-39.26258	415.7613	856.2036
MFIsize	13315.42	17414.15	-4098.729	5651.443
LatinA	524.9933	-8688.773	9213.766	10384.01

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

Test: Ho: difference in coefficients not systematic
 $\chi^2(6) = (b-B)'[(V_b-V_B)^{-1}](b-B)$
 = 2.96
 Prob>chi2 = 0.8136

Table 4-11 results Fixed Effect Model vs. Random Effect Model Hausman Test

Variable	Fixed Effect Model	Random Effect Model
Profitability (AROA)	X	√
Portfolio quality (PaR30)	X	√
Outreach (average Loan size, percentage of women clients, credit clients)	X	√

Source: Author own constructs

Key: X= Not appropriate;

√= Appropriate

From the Hausman test table 4-10 and table 4-11 which show summary of the results, the conclusion is that, there is a failure to reject the null hypothesis of “difference in coefficients not systematic” to determinants of profitability (arOA), determinants of portfolio quality (PaR30), determinants of average loan size (Lsize), determinants of percentage of women clients (Wclients) and, determinants of credit client (CrClients). This is because the value of $p > 0.05$ at level of 5%. Therefore, this implies that, these are analysed using the random effects model.

CHAPTER FIVE: DATA ANALYSIS AND FINDINGS

This chapter presents the finding and empirical analysis of the relationships predicted in the hypotheses. The empirical analyses include use of random effect model. Relationships between variables are presented with brief comments on this chapter and, fully discussions are done on the next chapter.

Tab 5-1 Descriptive statistics for dependent, independent and control variables

Variable	Mean	Std. Dev.	Min	Max	N
Dependent variables					
Adjusted Return on Assets (AROA)	0.0105	0.1217	-0.9900	0.3420	1421
Portfolio at risk (PaR30)	0.0634	0.0967	-0.2710	0.9730	1465
Average loan size	1.1584	7.1619	0.0000	175.4167	1390
Percentage of women clients	0.7087	0.2520	0.0000	1.0000	243
Credit clients	12909.18	27295.36	0.0000	394462	1438
Independent variables					
CEO business experience	0.6387	0.4805	0.0000	1.0000	1019
CEO business education	0.5209	0.4998	0.0000	1.0000	566
MFI Control variables					
Regulation	0.2827	0.4561	0.0000	3.0000	1567
MFI size	7.7488	1.6122	2.9089	12.8498	1537
MFI age	9.2631	6.7452	0.0000	79.0000	1604
Country control variable					
Human Deve. Index (HDI)	0.5627	0.1343	0.2390	0.7640	1573
Competition	4.3943	1.5311	1.0000	7.0000	459
Region control variables					
Latin America	0.2934	0.4554	0.0000	1.0000	3627
Africa	0.2357	0.4245	0.0000	1.0000	3627
Middle East	0.0372	0.1893	0.0000	1.0000	3627
Eastern Europe	0.1830	0.3867	0.0000	1.0000	3627

5.1 Descriptive evidence

From the table 5-1; 63.87% of CEO has business experience; this is because the business experience includes attributes such as CEO ownership of business, management of the previous business prior to becoming the CEO and if the CEO is hired internally within the MFI. This is evidenced by the fact that most MFIs are started by an individual who has

entrepreneurial skills and or ideas to help poor people and, who eventually become CEO (e.g Valadez and Buskirk, 2011a, Yunus, 1999). There is 52.09% of CEO with business education. This is not surprising because the CEO education is considered as a university level undergraduate or graduate in business, banking, accounting, management, and economics and similar. It takes many years to acquire this formal business education. This implies that there are more CEOs with business experience than CEO with business education.

The region control variables has the highest number of observations because there is no missing value and the number of cases from 74 countries were 403 of which were collected from 2001 to 2009 for 9 years (*i.e* $403 \times 9 = 3627$). There are few numbers of observations for percentages of women clients and competition because there are one to two years of records available which capture these variables.

Tab 5-2 Correlations for dependent variables

	1	2	3	4	5
(1)AROA	1				
(2)PaR30	-0.2696*	1			
(3)Average loan size	-0.0775*	0.0021	1		
(4)Percentage of women clients	0.1048	-0.0255	0.0407	1	
(5)Credit clients	0.1162*	-0.0958*	-0.0527*	0.1991*	1

*indicates $p < 0.05$

From table 5-2 above, the correlation between the return on assets and portfolio at risk is negative which means that better return on assets is related to fewer loans defaults and is significant at $p < 0.05$ (at 5 percent significant level). The practice of clients paying the loan amount plus interest thereon ensures availability of loan to other clients. The average loan size is negatively related to return on assets and is significant at $p < 0.05$ (at 5 percent significant level). More credit clients are associated with profitability.

5.2 Regression results and data analysis

This section analyses the results from the regression output of the relationship between CEO formal business education and experience on financial and outreach performance.

CEO characteristics and MFIs financial performance of return on assets and portfolio at risk (PaR30) are presented in table 5-3.

Tab 5-3 CEO characteristics and MFI Financial performance

	(1)	(2)	(3)	(4)
	AROA	AROA	PaR30	PaR30
CEO=Bus. experience	0.106*	0.167*	-0.118*	-0.157*
	(2.03)	(2.18)	(-2.16)	(-2.33)
CEO=Bus. education	0.0402	0.0111	0.00760	-0.00996
	(0.99)	(0.28)	(0.38)	(-0.46)
MFI age		0.00168		0.00271*
		(0.83)		(2.47)
MFI size		0.0563*		-0.0382**
		(2.37)		(-2.72)
Competition		0.00438		0.000915
		(0.50)		(0.19)
Regulation		-0.0627*		0.0178
		(-2.01)		(1.36)
Human Dev. Index		-0.501***		0.373***
		(-3.30)		(4.23)
_cons	0.305**	0.423**	-0.118***	-0.107***
	(2.69)	(2.92)	(-3.46)	(-3.73)
<i>N</i>	312	149	453	198
<i>Overall R-sq</i>	0.0128	0.1011	0.0267	0.17
<i>Wald χ^2</i>	(2) 5.95	(11) 21.09	(2) 12.91	(11) 36.49
<i>Prob > chi2</i>	0.0510	0.0205	0.0016	0.0001

z statistics in parentheses

+ indicates $p < 0.10$, * indicates $p < 0.05$, ** indicates $p < 0.01$, *** indicates $p < 0.001$

The data analysis of the output is based on the research question “Does MFIs with CEO with formal business education and business experience have better outreach and financial performance compared with MFIs with CEO without formal business education and business experience?” and the following hypotheses.

Hypothesis 1a: MFIs with CEO with formal business education have better financial performance compared with MFIs with CEO without formal business education.

Hypothesis 2a: MFIs with CEO with business experience have better financial performance compared with MFIs with CEO without business experience.

From the table 5-3 page 36 (model 2 and 4) the coefficient of CEO with business experience on return on assets is positive, as expected, and on portfolio at risk for 30 days is negative, as expected, and all are statistically significant at $p < 0.05$ (for 5 percent significant level). This confirms the second hypothesis (H2a) namely; MFIs with CEO with business experience have better financial performance compared with MFIs with CEO without business experience. This variable also has significant influence on return on assets $t = 2.18$; Portfolio at risk for 30 days $t = -2.33$ which both are higher than $t = 1.96$ (for 95 percent confidence level). The coefficient for CEO with formal business education (model 2 and 4) on return on assets is positive, as expected, and on portfolio at risk for 30 days is negative, as expected but all are statically not significant. This result does not support the first hypothesis (H1a) namely; MFIs with CEO with formal business education have better financial performance compared with MFIs with CEO without formal business education.

CEO characteristics and MFIs outreach performance of average loan size, percentage of women clients and credit clients are presented in table 5-4. The analysis of the output is based on the research question “*Does MFI with CEO with formal business education and business experience have better outreach and financial performance compared with MFIs with CEO without formal business education and business experience?*” and the following hypotheses.

Hypothesis 1b: *MFIs with CEO with formal business education are associated with more outreach performance compared with MFIs with CEO without formal business education.*

Hypothesis 2b: *MFIs with CEO with business experience have more outreach performance compared with MFIs with CEO without business experience.*

Tab 5-4 CEO characteristics and MFI outreach performance

	(1)	(2)	(3)	(4)	(5)	(6)
	Average Loan size	Average Loan size	Percenta ge of Women Clients	Percentage of Women Clients	Credit clients	Credit clients
CEO=Bus. experience	-1.522* (-2.25)	-1.598* (-2.52)	0.161** (2.49)	0.153* (2.28)	1447.6* (2.03)	1910.0* (-2.09)
CEO=Bus. education	-0.648 (-1.67)	-0.873* (-2.22)	0.147* (2.38)	0.161* (2.48)	3693.7 (1.38)	1695.6+ (1.65)
MFI age		-0.00641 (-0.36)		0.00035 (0.08)		136.9 (1.02)
MFI size		-0.284 (-1.70)		-0.0109 (-0.78)		5567.1*** (5.66)
Competition		-0.0147 (-0.22)		0.0139 (0.93)		-1798.7 (-1.75)
Regulation		0.120 (1.25)		-0.0140 (-1.28)		-518.8 (-0.78)
Human Dev. Index		4.233*** (3.88)		1.097*** (3.32)		-29109.9* (-2.05)
_cons	-2.922** (-3.25)	-3.598** (-4.52)	0.668*** (18.63)	0.124** (10.52)	7564.6*** (6.67)	-50023.2*** (-3.50)
<i>N</i>	464	197	100	88	618	509
<i>Overall R-sq</i>	0.0138	0.1276	0.0387	0.2099	0.0074	0.2644
<i>Wald χ^2</i>	(2) 12.02	(11)30.95	(2)6.24	(11) 29.89	(2) 32.56	(11) 40.07
<i>Prob > chi2</i>	0.0025	0.0006	0.0441	0.0017	0.0008	0.0003

z statistics in parentheses

+ indicates $p < 0.10$, * indicates $p < 0.05$, ** indicates $p < 0.01$, *** indicates $p < 0.001$

From table 5-4 above (model 2, 4 and 6) the coefficient for CEO with business experience on average loan size is negative, as expected, and on percentage of women clients is positive, as expected, and on credit clients is positive, as expected, and all are statistically significant at $p < 0.05$ (for 5 percent significant level). These confirm the second hypothesis (H2b) namely; MFIs with CEO with business experience have better outreach than MFIs with CEO without business experience. This variable also has a strong influence on average loan size ($t = -2.52$);

percentage of women clients ($t=2.28$); and credit clients ($t=-2.09$) which both are higher than $t=1.96$ (for 95 percent confidence interval).

The coefficient for CEO with formal business education (model 2, 4 and 6) on average loan size is negative, as expected, and on percentage of women clients is positive, as expected, and on credit clients is positive, as expected, and all are statistically significant at $p<0.05$ for average loan size and percentage of women clients; and $p<0.1$ for credit clients. These confirm the first hypothesis (H1b) namely; MFIs with CEO with formal business education have better outreach performance compared with MFIs with CEO without formal business education. This variable has pronounced influence on average loan size and percentage of women clients where the absolute value of t is higher than 1.96 (for 95 percent confidence level).

5.3 Additional regression analyses and robustness checks

I performed additional regression analysis to see if the outcomes of CEO characteristics on MFIs performance are influenced by CEO founder, given that empirical evidence shows that CEO founder are associated with better MFIs performance (Mersland. et al., 2011). Using random effect model (REM), I run a regression for each of the dependent variables in financial and outreach performance as previously used with the option of “*if CEO founder==0*”. This means that CEO with formal business education and experience who are not founder of the MFI they manage. Lastly, I run regression analysis with Operating Self-Sufficiency (OSS) and Write-off have as dependent variables in the model, in order to check the extent of influence of CEO formal business education and business experience. I also use the option of “*if CEO is founder==0*”

I also tested for the existence of endogeneity in the relationship between CEO characteristics who are not founder, Operating self-sufficiency and write-off and MFIs performance. The results in table 5-5 next page show that endogeneity problem does not exist in these relationships.

Tab 5-5 additional regression and robustness checks testing for endogeneity results

AROA		If CEO founder==0	
Tests of endogeneity of:		CEOBEDU	CEOBEXP
H0: Regressor is exogenous			
Wu-Hausman F test:	P-value	0.13364	0.35115
Durbin-Wu-Hausman chi-sq test:	P-value	0.12461	0.33734
PaR30		If CEO founder==0	
Tests of endogeneity of:		CEOBEDU	CEOBEXP
H0: Regressor is exogenous			
Wu-Hausman F test:	P-value	0.25889	0.13269
Durbin-Wu-Hausman chi-sq test:	P-value	0.24837	0.12533
Average Loan size		If CEO founder==0	
Tests of endogeneity of:		CEOBEDU	CEOBEXP
H0: Regressor is exogenous			
Wu-Hausman F test:	P-value	0.87275	0.24701
Durbin-Wu-Hausman chi-sq test:	P-value	0.87144	0.23655
Percentage of Women clients		If CEO founder==0	
Tests of endogeneity of:		CEOBEDU	CEOBEXP
H0: Regressor is exogenous			
Wu-Hausman F test:	P-value	0.09865	0.6435
Durbin-Wu-Hausman chi-sq test:	P-value	0.08641	0.62526
Credit Clients		If CEO founder==0	
Tests of endogeneity of:		CEOBEDU	CEOBEXP
H0: Regressor is exogenous			
Wu-Hausman F test:	P-value	0.19715	0.84215
Durbin-Wu-Hausman chi-sq test:	P-value	0.19155	0.83974
Operating Self-Sufficiency		If CEO founder==0	
Tests of endogeneity of:		CEOBEDU	CEOBEXP
H0: Regressor is exogenous			
Wu-Hausman F test:	P-value	0.33874	0.99111
Durbin-Wu-Hausman chi-sq test:	P-value	0.32605	0.99085
Operating Self-Sufficiency		If CEO founder==0	
Tests of endogeneity of:		CEOBEDU	CEOBEXP
H0: Regressor is exogenous			
Wu-Hausman F test:	P-value	0.0733	0.90675
Durbin-Wu-Hausman chi-sq test:	P-value	0.06568	0.90263
Write-off		If CEO founder==0	
Tests of endogeneity of:		CEOBEDU	CEOBEXP
H0: Regressor is exogenous			
Wu-Hausman F test:	P-value	0.13076	0.67756
Durbin-Wu-Hausman chi-sq test:	P-value	0.12569	0.67219
Write-off		If CEO founder==0	
Tests of endogeneity of:		CEOBEDU	CEOBEXP
H0: Regressor is exogenous			
Wu-Hausman F test:	P-value	0.4531	0.50478
Durbin-Wu-Hausman chi-sq test:	P-value	0.44168	0.49384

Table 5-6 below report CEO characteristics and MFIs return on assets and portfolio at risk for 30 days when CEO is not founder. The results show that there is a positive and statically significant $p < 0.05$ (at 5 percent significant level), as expected, coefficient for CEO business experience on return on assets; negative and statistically significant $p < 0.05$ (at 5 percent significant level), as expected, on portfolio at risk for 30 days. The coefficient of CEO formal business education is not significant, as expected, in both return on assets and portfolio at risk for 30 days.

Table 5-7 report CEO characteristics and MFIs outreach when CEO is not founder. The results shows that there is a positive and statistically significant $p < 0.05$ (at 5 percent significant level), as expected, coefficient of CEO business experience on percentage of women clients and credit clients.

Tab 5-6 CEO characteristics and MFI financial performance without CEO founder

	(1)	(2)	(3)	(4)
	AROA	AROA	PaR30	PaR30
CEO=Bus. experience	0.0514 ⁺	0.0374*	-0.048*	-0.0366*
	(1.91)	(2.20)	(-1.98)	(-2.26)
CEO=Bus. education	-0.0037	-0.00098	0.0005	0.0110
	(-0.28)	(-0.07)	(0.03)	(0.69)
MFI age		0.000148		0.00128
		(0.15)		(1.22)
MFI size		0.0262*		0.00857*
		(4.15)		(2.11)
Competition		0.00255		0.00360
		(0.60)		(0.72)
Regulation		-0.0376*		0.00901
		(-2.31)		(0.79)
Human Dev. Index		-0.167*		-0.0809
		(-2.08)		(-1.06)
_cons	0.0396*	0.260**	-0.230**	-0.227***
	(2.36)	(2.81)	(-2.58)	(-3.37)
<i>N</i>	600	507	592	559
<i>Overall R-sq</i>	0.0192	0.1178	0.0539	0.0785
<i>Wald χ^2</i>	(2)10.95	(11) 43.09	(2)21.54	(11) 35.75
<i>Prob > chi2</i>	0.0042	0.0053	0.0001	0.0003

z statistics in parentheses

⁺indicates $p < 0.10$, *indicates $p < 0.05$, ** indicates $p < 0.01$, *** indicates $p < 0.001$

The coefficient for CEO business experience on average loan size is negative, as expected, and statistically significant $p < 0.05$ (at 5 percent significant level).

The coefficient for CEO with formal business education is positive and statistically significant $p < 0.05$ (at 5 significant level), as expected, on percentage of women clients, and is positive and statistically significant $p < 0.1$ (at 10 percent significant level), as expected, on credit clients. The coefficient of CEO formal business education on average loan size is negative, as expected, and statistically significant $p < 0.05$ (at 5 percent significant level).

Tab 5-7 CEO characteristics and MFI Outreach performance without CEO founder

	(1)	(2)	(3)	(4)	(5)	(6)
	Average Loan size	Average Loan size	Percentage of Women Clients	Percentage of Women Clients	Credit clients	Credit clients
CEOBEXP	-1.167* (-2.13)	-1.374* (-2.24)	0.0731* (2.31)	0.0669* (2.19)	10341.5* (1.98)	1180.5* (2.04)
CEOBEDU	-0.576 (-1.41)	-0.784* (-2.03)	0.119* (2.11)	0.1497* (2.36)	3563.5 (1.22)	1676.0+ (1.67)
MFI age		-0.0088 (-0.48)		-0.00364 (-0.67)		69.49 (0.38)
MFI size		-0.0359 (-0.32)		0.0250 (1.20)		7190.5*** (8.08)
Competition		0.135 (1.55)		-0.0146 (-0.67)		-1068.4 (-1.24)
Regulation		-0.162 (-0.57)		-0.0218 (-0.24)		-1074.8 (-0.48)
Human Dev. Index		-0.178 (-0.13)		1.466*** (3.79)		-23514.2 (-1.60)
_cons	0.1456** (2.49)	-0.2504** (-3.03)	0.665*** (5.15)	-0.783*** (-6.84)	-6050.9** (-3.32)	-76490.4*** (-5.22)
<i>N</i>	258	242	54	47	259	243
<i>Overall R-sq</i>	0.0129	0.0493	0.0187	0.1554	0.0044	0.1635
<i>Wald χ^2</i>	(2) 9.77	(11)28.8 9	(2) 4.24	(11) 24.78	(2) 27.00	(11)29.49
<i>Prob > chi2</i>	0.0016	0.0003	0.0243	0.0058	0.0000	0.0000

z statistics in parentheses

+ indicates $p < 0.10$, * indicates $p < 0.05$, ** indicates $p < 0.01$, *** indicates $p < 0.001$

From the robust regression in table 5-6 and 5-7, I conclude that I find no effect when the CEO founder is not included as CEO with business experience and formal business, hence the report results are robust.

To run the additional regression analysis for operating self-sufficiency and write-off, this study checked whether they models that are used obey the assumptions of multiple regression analysis. The operating self-sufficiency and write-off variables were normally distributed.

I tested for heteroscedasticity using Breusch-Pagan test. Table 5-8 below shows the results. The test results for determinants of operating self-sufficiency (OSS) were not statistically significant ($p > 0.05$ for 5 percent significant level), hence I failed to reject the null hypothesis. The test results for determinants of write off is statistically significant ($p < 0.05$ for 5 percent significant level), which implies that there is unequal variance. Therefore, this model was run with constant error as suggested by econometrics literature (Verbeek, 2012, Studenmund, 2006, Greene, 2012).

Tab 5-8 additional regression Breusch-Pagan test for heteroscedasticity

```
. hetttest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of OSS

      chi2(1)      =      0.50
      Prob > chi2   =      0.4790

Determinants of write-off

. hetttest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of write_off

      chi2(1)      =     157.06
      Prob > chi2   =      0.0000
```

I tested autocorrelation using Wooldridge test. Table 5-9 next page shows the results. The results for determinants of write off were not significant ($p > 0.05$ for 5 percent significant level), hence I failed to reject the null hypothesis. The result for determinants of operating self-sufficiency was statistically significant ($p < 0.05$ for 5 percent significant level), hence I rejected the null hypothesis, apparently, the model was run with standard error as suggested in econometrics literature (Gujarati and Porter, 2010, Stock and Watson, 2003).

Tab 5-9 Wooldridge test for Autocorrelation results

Determinants of operating self-sufficiency (OSS)

```
. xtserial OSS CEOBEXP CEOBEDU `controls'
```

wooldridge test for autocorrelation in panel data

H0: no first order autocorrelation

```
F( 1, 75) = 12.465  
Prob > F = 0.0007
```

Determinants of write off

```
. xtserial write_off CEOBEXP CEOBEDU `controls'
```

wooldridge test for autocorrelation in panel data

H0: no first order autocorrelation

```
F( 1, 118) = 3.193  
Prob > F = 0.0765
```

I also run Hausman test to decide the model for use. Table 5-10 next page shows the results. All test results were statistically not significant ($p > 0.05$ for 5 percent significant level); hence I failed to reject the null hypothesis. Following these results, I used random effect model to in the regression analysis.

Tab 5-10 additional regression Hausman test results

Determinants of operating self-sufficiency				
. hausman fe re				
	Coefficients		(b-B)	sqrt(diag(v_b-v_B))
	(b)	(B)	Difference	S.E.
	fe	re		
Competition	-.3521799	-.0049933	-.3471866	.249044
hdi	.166146	.0061652	.1599808	14.87311
MFIage	.3444186	-.0113806	.3557993	.2242918
MFIsize	-1.158702	.2122747	-1.370976	1.08068

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

Test: Ho: difference in coefficients not systematic
 $\chi^2(4) = (b-B)'[(v_b-v_B)^{-1}](b-B)$
 = 3.31
 Prob>chi2 = 0.5072

Determinants of write-off				
. hausman fe re				
	Coefficients		(b-B)	sqrt(diag(v_b-v_B))
	(b)	(B)	Difference	S.E.
	fe	re		
Competition	.0001789	-.0026148	.0027936	.0062354
Regulation	.00125	-.0017047	.0029547	.0045331
hdi	-.0645513	.062998	-.1275493	.4700812
MFIage	-.0052218	.0002503	-.0054721	.002527
MFIsize	.0214028	-.0061793	.0275821	.0166707

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

Test: Ho: difference in coefficients not systematic
 $\chi^2(5) = (b-B)'[(v_b-v_B)^{-1}](b-B)$
 = 5.89
 Prob>chi2 = 0.3168

Table 5-11 next page shows robust regression results for CEO characteristics and MFIs operational self-sufficiency (OSS) when the CEO is founder and when the CEO not founder. From the table, CEO business experience coefficient is positive and statistically significant $p < 0.05$ (at 5 percent significant level) in both case when the CEO is founder and not founder. The coefficient for CEO with formal business education is not significant in both case, when the CEO is founder and when the CEO is not founder.

Table 5-12 page 47 shows robust regression results for CEO characteristics and MFIs write-off when the CEO is fonder and when not founder. The coefficient for CEO with business experience in both case is negative, and statistically significant $p < 0.05$ (at 5 percent

significant level). The results for CEO with formal business education are somehow appealing.

Tab 5-11 CEO characteristics and operational self-sufficiency

	With CEO founder		Without CEO founder	
	(1) OSS	(2) OSS	(3) OSS	(4) OSS
CEOBEXP	0.0415 (1.14)	0.0779* (2.12)	0.0316 (1.01)	0.06117* (2.01)
CEOBEDU	0.0569 (0.75)	-0.0229 (-0.29)	-0.0302 (-0.21)	-0.0874 (-0.67)
MFI age		-0.00638 (-1.36)		-0.00895 (-1.70)
MFI size		0.0902*** (4.15)		0.143*** (4.85)
Competition		0.00741 (0.34)		0.0149 (0.60)
Regulation		-0.104 (-1.28)		-0.238** (-2.65)
Human Dev. Index		0.650 (1.32)		0.402 (0.67)
_cons	1.087*** (4.31)	1.543** (5.29)	1.071** (3.55)	-1.334** (-4.72)
<i>N</i>	368	341	170	159
<i>Overall R-sq</i>	0.0031	0.1004	0.0067	0.2354
<i>Wald χ^2</i>	(2) 5.21	(11) 31.41	(2) 18.32	(11) 36.61
<i>Prob > chi2</i>	0.048	0.0009	0.0051	0.0001

z statistics in parentheses

+ indicates $p < 0.10$, * indicates $p < 0.05$, ** indicates $p < 0.01$, *** indicates $p < 0.001$

When the CEO founder is grouped with the CEO characteristics, the coefficient is negative and not significant, but when the CEO founder is not included, the coefficient is positive and statistically significant $p < 0.05$ (at 5 percent significant level).

I found significant results ($p < 0.05$ at 5 percent significant level) from the robust regression results in table 5-11 and 5-12 on CEO characteristics, MFIs operational self-sufficiency and write-off when the CEO is founder grouped in CEO characteristics and when excluded. CEO business experience is associated with covering their cost of operation through revenue. The results are significant in both cases when the CEO founder grouped in CEO characteristics and when excluded. This is consistent with the result I obtained when I used the return on assets. The results also show that CEO with business experience is associated with few write-offs of loan. This is same in both cases when the CEO founder is grouped in CEO characteristics and when excluded.

Tab 5-12 CEO characteristics and the write-off

	With CEO founder		Without CEO founder	
	(1) Write-off	(2) Write-off	(3) Write-off	(4) Write-off
CEOBEXP	-0.00409 (-1.10)	-0.00801* (-2.00)	-0.00505 (-1.35)	-0.00619* (-1.98)
CEOBEDU	-0.00527 (-1.07)	-0.00352 (-1.26)	0.0161* (2.86)	0.0166* (3.30)
MFI age		0.000169 (0.70)		0.000293 (0.88)
MFI size		-0.00308* (-2.21)		-0.00448* (-2.05)
Competition		-0.000978 (-0.87)		-0.00262 (-1.63)
Regulation		0.00247 (0.65)		0.00363 (0.67)
Human Dev. Index		0.0417 (1.72)		0.0144 (0.38)
_cons	0.0217*** (7.23)	0.1420*** (8.74)	0.03721*** (6.75)	0.0742**** (7.01)
<i>N</i>	576	557	245	234
<i>Overall R-sq</i>	0.0161	0.1543	0.0170	0.0866
<i>Wald χ^2</i>	(2)36.72	(11)30.83	(2)41.89	(11)39.99
<i>Prob > chi2</i>	0.0013	0.0000	0.000	0.000

z statistics in parentheses

+ indicates $p < 0.10$, * indicates $p < 0.05$, ** indicates $p < 0.01$, *** indicates $p < 0.001$

CHAPTER SIX: DISCUSSION, CONCLUSION, IMPLICATIONS, AREAS FOR FUTURE STUDIES AND LIMITATIONS

This section discusses the results from the data analysis in chapter five. The discussion covers theoretical policy and managerial implications of the findings, future areas of study and limitations of the study.

6.1 Discussion

Most of the existing literature on CEO characteristics and firm performance are in the context of limited liabilities companies which focuses on profit motives only (e.g. Barker and Mueller, 2002, Rajagopalan and Datta, 1996, Harjoto and Jo, 2009, Nelson, 2005, Manner, 2010, Bigley and Wiersema, 2002a, Bhagat et al., 2010a, Gottesman and Morey, 2010, Gottesman and Morey, 2006, Jalbert et al., 2011). A critical question is that, is there significant results to support the fact that MFIs with CEO with formal business education and business experience have better performance compared to MFI with CEO without these characteristics?

Drawing from resource based view theory and upper echelons theory (Slater and Dixon-Fowler, 2009, Kunc and Morecroft, 2010, Roth, 1995); I have argued that, CEO is unique, resourceful personnel having managerial characteristics of formal business education and business experience. The interactions of these managerial characteristics with strategic decision making process enable the MFIs they manage to have better financial and outreach performance compared to MFIs with CEO without these managerial characteristics (Stuart, 2011). The results support this argument for MFIs with CEO with business experience and partly support the argument for MFIs with CEO with formal business education.

The positive and significant results coefficient of CEO with business experience on return on assets; credit clients and percentage of women clients are vital. This is because MFIs with CEO with business experience are more profitable; associated with credit clients growth and serves more women clients who have an exemplary record of paying their loan (D'Espallier et al., 2011, McCarter, 2006) than MFIs which their CEO does not have business experience.

The negative and significant results (at $p < 0.05$ for 5 percent significant level) coefficient of CEO with business experience on average loan size, and portfolio at risk for 30

days imply that MFI with CEO with business experience provide smaller loan and their clients have fewer default of outstanding loan for 30 days. The smaller loan is the reflection of reaching more poor clients (Galema and Lensink, 2011, Armendariz and Labie, 2011), and timely repayment rate of loan is consistent with the focus on women clients, which has fewer defaults. The use of average loan size, percentage of women clients and credit clients measures of outreach are also, recently used in the MFIs literature (Mersland et al., 2011, Mersland and Strøm, 2009a, Hartarska and Mersland, 2009, Galema and Lensink, 2011).

Therefore, MFIs with CEO with business experience, reach more clients, have fewer defaults and are profitable compared with MFIs with CEO without business experience (Hartarska, 2005, Stuart and Abetti, 1990, Stuart, 2011, Sow Hup, 2010). There is anecdotal evidence to support this argument that profitability with a focus on clients is a core to success of many MFIs business model (DiLeo., 2012, Ayayi and Sene, 2010).

The statistical insignificance coefficient of CEO with formal business education on return on assets and portfolio at risk for 30 days, means, that MFIs with CEO with formal business education profitability and rate of defaults does not perform differently from those MFIs which their CEO without formal business education (e. g. University degree in engineering and law). There is empirical support to this results in the international business research, where CEO with formal business education does not perform differently from those CEO with other discipline of education⁴ (Gottesman and Morey, 2010, Gottesman and Morey, 2006, Jalbert et al., 2011, Martelli and Abels, 2010, Dreher and Ryan, 2001). Other studies (e.g. Bhagat et al., 2010a) show that formal business education brings short term improvement in financial performance, but the relationship is not significant in the long term financial performance.

The positive statistical significant results coefficient of CEO with formal business education on percentage of women clients ($p < 0.05$ at 5 percent significant level); and on credit clients ($p < 0.1$ at 10 percent significant level) is vital. This is because, MFIs with CEO with formal business education serves more female clients and have better credit clients' growth compared to MFIs with CEO without formal business education. This implies that CEO with formal business education fosters outreach through reaching more credit clients

⁴ For example CEO with University degree in Engineering and law

who are women and who has a solid history of repaying their loan (D'Espallier et al., 2011, Chowdhury and Chowdhury, 2011, Krishnan, 2011, McCarter, 2006).

The negative statistical significant ($p < 0.05$ at 5 percent significant level) coefficient of CEO with formal business education on average loan size implies that MFIs with CEO with formal business education provide small loan size.

An interesting question to this result is why these CEO with formal business education provides smaller loan. While they know that small loan has higher transaction costs (Armendariz and Labie, 2011, Galema and Lensink, 2011, Mersland and Strøm, 2010). I could argue that these higher transaction costs compensated using higher interest rate to cover all the costs (Cull et al., 2011, Garmaise and Natividad, 2010, Rosengard, 2011). With higher interest rate, they could serve more credit clients as the findings of this study indicated and, that they serve more credit clients, but also with more women clients. However, this need to be interpreted with precautions because, sometimes higher interest rates lead into a higher rate of defaults (see CGAP, 2010).

A critical, empirical question without guiding theory is that, does the CEO with formal business education still choose to offer smaller loan size given these consequences? The argument could be yes! However, anecdotal evidence in MFIs argues that CEOs in MFIs are aware of the issue of mission drift (Stuart, 2011), which makes them, more concerned with creating public value that is directly advantageous to clients and legally accepted.

6.2 Conclusion

The growing concern among MFIs practitioners and other stakeholder in the microfinance industry is that of short supply of CEOs with managerial experiences in finance, banking and accounting, or technical expertise and professionalism (Mendelson, 2011, Lascelles et al., 2011). Regardless of this concern, there are limited empirical evidence to whether MFIs with CEO with formal business education and business experience have better performance than MFIs with CEO without formal business education and business experience (Sow Hup, 2010).

This study was able to add knowledge on the issue using data from 403 rated MFIs in 74 countries for the period of 9 years from 2001 to 2009, by providing both descriptive and

econometric evidence from panel data estimation using random effect model (REM) on the influence of CEO with formal business education and experience on MFIs performance.

The conclusions are that, the MFIs with CEO with business experience have better financial and outreach performance compared with the MFIs with CEO without business experience. MFIs with CEO with formal business education have better outreach compared to MFIs with CEO without formal business education, while the study find that the financial performance of MFIs with CEO with formal business education does not differ significantly with those of MFIs with CEO without formal business education. These results were consistent even after running robustness check and additional regression analysis.

6.3 Theoretical, policy and managerial implications

The findings of this study on two of the managerial characteristics of the CEOs in MFIs are applicable in many different ways, mainly with respect to understanding the influence of CEOs with formal business education and experience in MFIs performance broadly. The better financial and outreach performance of MFIs with CEO with business experience compared to those MFIs with CEO without business experience highlights the need and importance of this managerial characteristic for a better future of the microfinance industry as also addressed in the microfinance banana skin 2011 (Lascelles et al., 2011).

Even though, the results show no difference in terms of return on assets and portfolio at risk for 30 days between MFIs with CEO with formal business education and those MFIs with CEO without such characteristics, empirical studies uphold the importance of formal business education for CEOs (see Hansen et al., 2010). This is further empirically confirmed by the results of this study, where MFIs with CEO with formal business education has better outreach compared to MFIs with CEO without formal business education.

The flaw associated with practical applications of formal business education in MFIs is unavoidable because most program in business education concentrate much on quantitative-based analytical skills rather than developing leadership and interpersonal skills that are necessary for success in high level of managerial cadre (Gottesman and Morey, 2010). I, therefore, suggest that apart from training on quantitative-based analytical skill,

business school should focus also on developing⁵ leadership and interpersonal skill that could help those who aspire for higher managerial cadre.

Moreover, the labor market for CEO in MFIs is thin, and there are few qualified CEOs (Mersland and Strøm, 2010, Mendelson, 2011, Lascelles et al., 2011). This could be due to the limited external forces to shape the CEO labor markets in MFIs, for example, due to differing ownership, as most MFI does not have true owners as compared to for profit only limited liability companies (Hartarska, 2005). I suggest those MFIs practitioners and other stakeholder like academician needs to pay attention to the way the labor market for CEOs in MFIs can be expanded. One issue that remain not well researched is that of compensation of CEOs in the microfinance industry. For example, unresolved CEOs compensations may not attract well qualified CEOs to work in the microfinance industry, or there could be nonalignment of interest of CEOs and owners in MFIs, hence poor performance (Ozkan, 2011, Krause, 2009, Walker and Kramer, 2011).

To the microfinance industry, the consistence of the regression results after running without the CEO founder implies that MFIs performance do better with CEOs with business experience who is non-founder. This implies that, in the future, the microfinance industry can benefit with CEO business experience from non-microfinance industry.

6.4 Areas for future studies

This study used only two of the CEO characteristics from the upper echelon theory; I propose future studies to include more variables of the CEO characteristic like CEO tenure in MFI, functional background and CEO age. The upper echelon theory proposes two moderating effect of managerial discretion and executive job demands (Hambrick, 2007). I propose that future studies could include one of these moderating effects. Also, future study can looks into the relationship between CEO and top management team size influence on MFIs performance.

6.5 Limitations of the study

The results in this study are subject to limitations. Use of secondary data renders data limitations. The data set used comprises of only rated MFIs which makes these data not to be

⁵ For example “*Internationalization Laboratory*” a known program to author for MBA students at University of Agder which “*Provide an in-depth understanding of Strategy and International Management, and use this knowledge in a real-life business case*” (for further information see www.uia.no).

representatives of all MFIs population. The data do not include such smaller MFIs which the five rating agencies does not, and large MFIs, which the regular banking agencies asses them. Also, the MFIs used in this study were only once rated during the sample period by rating agencies, and, therefore, the CEO characteristics do not vary over time, and I could not measure the effects of change of CEO characteristics over time.

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