DETERMINANT OF LOAN PORTFOLIO QUALITY IN LARGE MICRO FINANCE INSTITUTION

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LIST OF ACRONYMS

AEMFI= Association of Ethiopian Micro Finance Institutions

CLRM= Classical Linear Regression Model

DTL=deposit to loan ratio

I= micro finance index

LEV= leverage (debt to equity ratio)

LnTA= size

GLS=Generalized Least Square

GLP/TA= gross loan portfolio to total asset

MFI=micro finance information exchange

OLS= Ordinary Least Square

OPPEXP= operating expense ratio

ROE= return on equity

T= year index

VIF= Variance Inflation Factor

ABSTRACT

This study examined determinants of loan portfolios quality in large micro finance institution by using panel data of ten (10) MFIs from the period 2005- 2014. The study employed one dependent variables a s proxies for loan portfolios quality, namely: portfolio at risk over 90-days (PAR-90days) .This study was *crucial from the fact that there is limited research on large MFIs loan portfolios quality using quantitative approach in Ethiopia. This Loan portfolio quality is measured by six independent explanatory variables there are institution size (LnTA), debt to equity (LEV), Deposit to loans (DTL), operating expense ratio (OPEX). Gross loan portfolio/ total asset (GLP/TA) and return on equity (ROE). Secondary data was used for ten large micro finance institutions which stayed in the industry more than ten years. Data used for this analysis is obtained from the annual financial reports of large MFIs, data from books, journals, newspapers, magazines, and reports of various governmental and nongovernmental organizations such as AEMFI (Association of Ethiopian Micro Finance Institutions). The correlation and multiple regression analysis was done with random effect model and EView 7 software used to regress the data based on Regression result. The findings of the study revealed that size, debt to equity, deposit to loan, Gross loan portfolio/ total asset and return on equity had positively significant impact on portfolio at risk over 90 day at different level of significance and The study finds insignificant results on only operating expense ratio Accordingly, the findings of the study may have implications for large MFIs and policy makers in that it provides hint on some important determinants of loan portfolios quality.*

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

In the past four decades, access to financial services, especially microcredit, has played an increasing role in the development of most economies. Microcredit facilities have been made accessible to many households and Small and Medium Enterprises (SMEs) through microfinance

(Grameen Bank of Bangladeshi, 2004; Delali, 2006; Bank of Ghana (BoG), 2007; Arup & Goswami2013). In promoting economic development, governments and non-governmental organizations (NGOs) are strongly committed to the inclusion of the poor entrepreneurs through the provision of financial services like microloans, interest-free subsidies and other financial services, since these small firms are firms are excluded from the universal banking system due to their high risk status (Papias & Ganesan, 2009; Grameen2009; Grameen Bank, 2004). Waweru and Gary (2012) posit that universal banks consider the less privileged and less credit worthy.

Microfinance is the provision of financial service to the poor people with very small business or business projects (Marzys, 2006). Only a small fraction of the world population has access to financial instruments because commercial banks consider the poor people as un-bankable due to their lack of collateral and information asymmetries. Most large microfinance institutions do not require formal collateral, and instead base loan decisions on character, group solidarity, and past repayment history (Ruerd and Schers, 2007).

In the other way, the extent to which the loan secure is based on the large MFIs' screen, monitor and facilitate repayment activities. The more the MFIs properly analyze and approve loan has a significant impact on the loan repayment rate, which in turn brings back money to facilitate loan disbursement to other clients (Crabb and Keller,2004) Large Micro-Finance Institutions (MFIs) are often defined in terms of the following characteristics: targeting the poor (especially the poor women); promoting small businesses; building capacity of the poor; extending small loans without collaterals; combining credit with savings; and charging commercial interest rates. Large MFIs are often innovative and flexible in their design and implementation (Dejene, 1998)

The formal financial institutions have played little role in financing development efforts in the rural area because they are clustered in urban conglomerations, concentrate on funding large enterprise, inaccessible to the rural poor especially in terms of distance. In addition to this, the rural poor cannot fulfill banking requirements to obtain banks loan/credit. Besides requirements for collateral/material guarantee and intrinsic banking procedure which in most cases is very difficult for the poor to deal with, the volume loan demanded by small farmers/poor is not appealing to the bank. There are a number of studies (Ledgerwood, 1999) on the MF industry at international level because it has got the attention of academicians and practitioners as an innovative method of fighting poverty.

Moreover, most studies conducted were mainly concentrated on three key areas. The first area is impact assessment whether the provision of financial service has improved the lives of the poor in terms of economic, social and political indicators of poverty (Magnus, 2005). The second area is whether these financial service providers reach the poorest of the poor who is in need of financial services (Folake, 2005). The third is the issue of financial sustainability of large MFIs (Operetta, 2007).Currently; the Ethiopian large microfinance institutions are playing crucial roles in improving the life of poor societies and economic development of the country as a whole.

The development of large microfinance large microfinance institutions in Ethiopia is a recent phenomenon, Since then, various microfinance institutions have legally been registered and started delivering microfinance services (Wolday, 2000). With this regard, the vital objective of large MFIs is poverty alleviation. To do so, their loan portfolios should be secured, and can be collected in order to facilitate loan disbursement to other clients. As the loans provided are repaid on the contract date, the large MFIs more reach poor people in finance, which may in turn to increase loan portfolios quality.

Therefore, the study was intended to identify and analyze what factors affect loan portfolio quality.

1.2 Statement of the problem

Nowadays, large microfinance institutions are playing vital roles in economic development of developing countries. (Khandker,2003) points out that the goals of large microfinance institutions as development organizations are to service the financial needs of un-served or underserved markets as a means of meeting development objectives such as to create

employment, reduce poverty, empower women or poor people, and encourage the development of new business. But some problems are face greater loss on large micro finance institution.

Loan portfolio risk is a major challenge facing the financial sector and could result in reputation damage. As a result, many studies have been advanced in the industry to enhance understanding on loan portfolio risk management issues since it could have a significant effect on their financial operation (Javid, 2013). Most large MFIs do not require formal collateral, and instead base loan decisions on character, group solidarity, and past repayment history. Collateral, when pledged, may not be legally registered or may have little liquidation value. Thus, when loan portfolio quality suffers substantially,

Large MFIs face far greater loan losses relative to the amounts outstanding than intermediaries that operate other types of portfolios secured with collateral. If loans are not properly analyzed and approved to clients, there might be a significant adverse impact on the loan repayment rate (Crabb and Keller, 2004). Therefore identifying and analyzing what drives loan portfolio quality is very essential as it helps to have healthy loan.

however the study on loan portfolio determinant has focused mainly on the commercial and traditional banking institutions with less attention to the large micro finance sector (behr,2002) (chaibi,2015) (louzisetal,2012) so the above researcher was no or little conduct on the determinants of loan portfolio quality on large micro finance institution.

The aim of this research was to determine large micro finance institution practice in measuring the loan portfolio quality and consequently to give some insights in to how large microfinance institution loan portfolio quality could be improved.

1.3. Objective of the study

1.3.1 General Objective

The main objective of the study is to examine the determinants of loan portfolios quality in large microfinance institutions in Ethiopia.

1.3.2. Specific Objectives

In line with above stated main objective, the study was achieved the following specific objectives:

- To examine the effect of size on loan portfolio quality of Large MFI.
- To examine the effect of operating expense ratio on loan portfolio quality in Large MFI.
- To examine the effect of leverage (debt to equity ratio) on loan portfolio quality in Large MFI.
- To examine the effect of deposit to loan on loan portfolio quality in Large MFI.
- To examine the effect of gross loan portfolio to total asset ratio on loan portfolio quality in Large MFI.
- To examine the effect of return on equity on loan portfolio quality in Large MFI**.**

1.4 Hypotheses of the study

In line with the main objective of the study, the researcher has developed the following hypotheses based on the theories and empirical studies discussed in literature related to large MFIs loan portfolios quality.

HP1: size has significant effect on loan portfolio quality.

HP2: operating expense ratio has significant effect on loan portfolio quality.

HP3: Leverage (debt to equity ratio) has significant effect on loan portfolio quality.

HP4: deposit to loan has significant effect on loan portfolio quality.

HP5: gross loan portfolio to total asset ratio has significant effect on loan portfolio quality.

HP6: return on equity has significant effect on loan portfolio quality**.**

1.5. Significance of the Study

This study is significant because as a whole it was add to the body of knowledge in this area of study.

- For policy makers the study was also serve as a guide for policy makers from government and especially financial institutions or agencies.
- This study clearly looks at what policy makers can done to improve on the existing policies in their contribution to economic development through loan portfolio quality in large micro finance institutions.

- For researcher the study may serve as stepping-stone for other studies, which may focus on similar topics and issues related to the determinants of loan portfolios quality of microfinance institution.

1.6. Scope of the Study

The area of the study was limited to the determinants of loan portfolios quality of Large MFIs in Ethiopia. The study was use quantitative variables which are measured numerically that obtained from their financial statement. The study time period covers 2005 to 2014.

1.7 Organization of the Paper

This paper is organized in five broad categories (chapter), the first chapter deals about the introduction of the study that is background, statement of the problem, objective, significance, and the research question (hypothesis). The second chapter discusses the theoretical and empirical literatures about credit risk. The third chapter is about the methodology of the research that is the research design, research approach and method of data analysis, chapter fourth chapter, data presentation analysis and interpretation Chapter five, summary Conclusion and recommendation.

CHAPTER TWO

2. REVIEW OF LITERATURES

2.1. Theoretical Review

2.1.1. What is a Microfinance Institution?

Different authors and organizations have defined Microfinance institutions in different ways. However, the essence of the definitions are usually the same in which microfinance refer to the provision of financial services; primarily savings and credit to the poor and low income households that don't have access to commercial banks. (Arsyad, 2005) and Leger wood (1999) defines micro finance institution as the provision of financial services (generally saving and credit) to low income clients. Robinson (2001) defines it as small scale financial services primarily credit and saving provided to people who farm or fish or herd; who operate small enterprises or micro-enterprises where goods are produced, recycled, repaired or sold; who provide services; who work for wage and commission; who gain income from renting out small amount of land, vehicles, draft animals, or machinery tools; and other individual and groups at the local level of developing countries both rural and urban area.

Microfinance came into being from the appreciation that micro-entrepreneurs and some poorer clients can be 'bankable', that is, they can repay, both the principal and interest, on time and also make savings, provided financial services are tailored to suit their needs. Microfinance as a discipline has created financial products and services that together have enabled low-income people to become clients of a banking intermediary.

The development of large microfinance institutions in Ethiopia is a recent phenomenon. The proclamation, which provides for the establishment of microfinance institutions, was issued in July 1996. Since then, various microfinance institutions have legally been registered and started delivering microfinance services (Wolday, 2000). In particular, the Licensing and Supervision of large Microfinance Institution Proclamation of the government encouraged the spread of large Microfinance Institutions (MFIs) in both rural and urban areas as it authorized them among other things, to legally accept deposits from the general public (hence diversify sources of funds), to draw and accept drafts, and to manage funds for the micro financing business (Getaneh, 2005).

Large MFIs operate in a niche market as they address the needs of those clients who are considered 'high-risk' by bigger banks. High-risk groups or individuals are characterized as those with very few assets, requiring very small loans, high degree of close follow-up, business appraisal and evaluation, as well as those engaged in activities whose income is fluctuating such as small-holder farmers or petty traders. Thus, the large MFIs cater for a market with an operationally acceptable demand level and clients can be protected from the unreasonable conditions of the informal money lenders. Such large MFIs, however, charge high administrative costs and higher charges for risk coverage, which is in addition to the market interest rates, and taking advantage of the niche market for microloans (Sunita, 2003).

2.1.2Characteristics of large Microfinance institution

Microfinance came into being from the appreciation that micro-entrepreneurs and some poorer clients can be 'bankable', that is, they can repay, both the principal and interest, on time and also make savings, provided financial services are tailored to suit their needs. Large Microfinance as a discipline has created financial products and services that together have enabled low-income people to become clients of a banking intermediary.

The characteristics of large microfinance products include (Murray, 2002) Little amounts of loans and savings, Short- terms loan (usually up to the term of one year), Payment schedules attribute frequent installments (or frequent deposits),Installments made up from both principal and interest, which amortized in course of time, Higher interest rates on credit (higher than commercial bank rates but lower than loans hark rates), which reflect the labor-intensive work associated with making small loans and allowing the microfinance intermediary to become sustainable over time. Easy entrance to the microfinance intermediary saves the time and money of the client and permits the intermediary to have a better idea about the clients' financial and social status and No collateral is required contrary to formal banking practices. Instead of collateral, microfinance intermediaries use alternative methods, like, the assessments of clients' repayment potential by running cash flow Analyses, which is based on the stream of cash flows, generated by the activities for which loans are taken.

2.1.3. Portfolio Theory

The loan portfolio is the primary income generating asset for a large MFI and it is most commonly subject to material misstatements. Most large MFI failures stem from the deterioration in the quality of the loan portfolio (Graham A, 2006).

The Portfolio Effect

This effect means that the fiduciary cannot make portfolio decisions by viewing the risk and return characteristics of one asset or asset class in isolation but must take into account how this asset's return correlates with all the other assets in the portfolio.

Problems with the practical application of portfolio theory

There are problems associated with trying to apply portfolio theory in practice, some of which are as follows it follows. It is unrealistic to assume that investors can borrow at the risk-free rate. Individuals and companies are not risk-free and will therefore not be able to borrow at the risk free rate; they will be charged a premium to reflect their higher level of risk.

There are problems with identifying the market portfolio as this requires knowledge of the risk and return of all risky investments and their corresponding correlation coefficients. Once the make-up of the market portfolio is identified it will be expensive to construct because of transaction costs. These costs will be prohibitive in the case of smaller investors and the composition of the market portfolio will change over time. This will be due to shifts both in the risk-free rate of return and in the envelope curve and hence the efficient frontier.

2.1.4. Terms and Definitions

According to Ledger wood (1999), the performance of large MFI is measured in many parameters Such as;

Productivity ratio: Productivity refers to the volume of business that is generated (output) for a given resource or asset (input). Common measures of productivity include the number of active loans per credit officer, and average portfolio outstanding per credit officer.

Leverage ratio: Leverage refers to the extent to which a large MFI borrows money relative to its amount of equity. In other words, it answers the question of how many additional dollars can

be mobilized from commercial sources for every dollar worth of funds owned by the large MFI. The most widely used measure of leverage is the debt equity ratio.

Gross loan portfolio:- The outstanding principal balance of all of an large MFI's outstanding loans, including current, delinquent, and restructured loans, but not loans that have been written off. It does not include interest receivable.

Loan Loss Rate: we can carry out such a historical analysis of loan portfolio performance by calculating the loan loss rate. The loan loss rate refers to the amount of loans that has actually been written off during a specific period of time. These are explicit losses that an institution has acknowledged because there is no possibility to recover or enforce the loan.

Portfolio Quality indicators: Portfolio quality ratios provide information on the percentage of non-earning assets, which in turn decrease the revenue and liquidity position of large MFIs. Some of the measures used include the repayment rates, arrears rate, Portfolio at risk, delinquent borrowers, loan loss reserve ratio, and loan loss ratio.

Deposit to loan ratio

Loan to deposit (LTD) ratio examines MFI liquidity by measuring the funds that MFI has utilized into loans from the collected deposits. It demonstrates the association between loans and deposits. Ranjan and Chandra (2003) analyze the determinants of NPLs and justifying that relatively more customer friendly bank is most likely face lower defaults as the borrower will have the expectation of turning to for the financial requirements.

.Higher leverage should make it easier to satisfy return requirements from shareholders and at the same time provide the lowest borrowing rates for customers. Higher leverage in the microfinance industry is also important for Equity and the importance of financial For example, in some countries any loan that is delinquent more than 30 days would be considered an NPL while in other systems the designation may only apply to loans that are 90 days past due. For example in Ethiopia Substandard NPL from 91-180 days, Doubtful from 181-365 days, and Loss Over 365 days leverage is the use of fixed rate financial instruments (usually debt) to raise additional capital to magnify the potential return on equity. Leverage is used when the ability of a business to generate return on investments is higher than the cost of debt used to finance those investments

Number of loans outstanding: - The numbers of loans that have been neither fully repaid nor written off and thus comprise part of the gross loan portfolio. For MFIs using a group-lending methodology, this term includes every individual who is responsible for repaying a portion of a group loan.

Value of loans written off: - The value of loans that have been recognized for accounting purposes as uncollectible. The process of recognizing an uncollectible loan is called a write-off or a charge-off. A write-off is an accounting procedure that removes the outstanding balance of the loan from the gross loan portfolio and from the loan-loss allowance. Thus the write-off does not affect the balance of the net loan portfolio, total assets, or any equity account, unless the loan-loss reserve was insufficient to cover the amount written off.

Number of active borrowers: - The numbers of individuals who currently have an outstanding loan balance with the MFI or are primarily responsible for repaying any portion of the gross loan portfolio. This number should be based on the number of individual borrowers rather than the number of groups.

Number of active clients:-The number of individuals who are active borrowers, depositors, or both. Individuals who have multiple loans or accounts with an MFI should be counted as a single client. Individuals who are not currently receiving any service directly from the MFI are not included, such as those with facilitated savings.

The loan portfolios the primary income generating asset for an MFI1 and it is most commonly subject to material misstatements. Most MFI failures stem from the deterioration in the quality of the loan portfolio (Graham A, P.6, 2006).

2.1.5 Microfinance Regulation in Ethiopia

The regulatory framework includes the proclamation 40/1996 and the 12 directives of the National Bank of Ethiopia (NBE). NBE (proclamation No. 83/1994) has the authority to license and supervise, and regulate banks insurance companies and other financial institutions the proclamation includes foreign national banks from involving in bank in business.

2.2 Empirical Review

(Obsa, 2012) examined the determinants of loan portfolios quality of MFIs in Ethiopia using a sample of 15 MFIs during 2003 to 2009 period. The results showed that a significant negative relationship between an institution size and LLP and PAR-30 days. Loan ratio (outstanding loans to total assets) positively and significantly impacts PAR-30 days and WOR. The coefficient for the ratio of women borrower reveals a significant negative impact on LLP and WOR; the estimates also show a significant inverse relation between changes in total loan and the three indicators of MFIs loan portfolio risk: LLP, PAR -30 days and WOR. Operating expense ratio, the measure of efficiency is positively related to WOR. The study did not observe any significant relationship between macroeconomic factors (changes in gross national income per capital and Inflation) and MFIs portfolio risks indicators: LLP, PAR-30 days and WOR.

(Nortey,2015), was examined Determinant of loan portfolio at risk from '162'micro finance institution from micro finance information exchange (MIX) market within sub-Saharan region for the period of (2000-2012) this study used fixed and robest fixed effect regression empirical model .This research work under took to classify key variables that influence loan portfolio quality in micro finance institution within sub Saharan Africa region they were classified as dependent and independent variable. dependent variable is portfolio at risk and independent variables are female, leverage(asset management),extent saving inefficiency, monitoring and loan intensity (volume of loan).Regression result indicate leverage estimated as total debt to total asset is negatively significant relationship with loan portfolio at risk, management inefficiency was highly positive significant relationship with loan portfolio at risk, monitoring number of client outstanding was positively related to loan portfolio at risk.

(sara2015),was found determinant of loan portfolios quality that examined from '14 micro finance institution in Ethiopia for the period of ten years(2003-2012) the study was employed dependent variables such as ;loan loss rate(LLR),portfolio at risk over 30(PAR30days) day portfolio at risk over 90days(PAR90days) and write-off ratio((WOR) and it have independent variables such as institutional size(LnTa)operating expense ratio(oppexp),age, gross loan portfolio to total asset leverage(debt to equity),deposit to loan, return on equity and inflation The study used descriptive and inferential statistics regression for data analysis result from the analysis show that institution size is negatively and significantly influence loan loss rate and

write-off ratio ,operating expense has negatively significant relationship with loan loss ,portfolio at risk over 30days and write –off ratio ,age of the micro finance institutions has positive significant relationship with portfolio at risk over '90' days ,deposit to loan has positively and significantly influence loan loss rate and write-off ratio and gross loan portfolio or total asset has negative significant impact on loan loss ratio and write-off ratio. the regression result also show that return on equity has negative significant relationship with loan loss ratio ,portfolio at risk over' 30' days ,portfolio at risk over '90'day and write –off ratio change in growth national income negatively and significantly influences portfolio at risk over' 30'day and portfolio at risk over 90 day.

Zeller (1998) examined the determinants of repayment performance for group lending in Madagascar using data from a random sample of 146 groups in 6 different lending programs. He found that group consisting of members facing homogenous risk exposure do not have higher repayment rates, but that repayment rates significantly improve when groups have some type of social cohesion, informal or not. Bhatt and Tang (2002) conducted a study to investigate the determinants of loan repayments in microcredit programs that applied the group lending approach, but took a different approach. Bhatt and Tang looked at the borrower's socio economic variables instead of the elements of group lending for their influence on loan repayment behavior. The borrower's socioeconomic variables included gender, educational level, household income and characteristics of the business (type of business, years in business, etc.). In their study, they found that a higher education level was significant and positively related to better repayment performance. Conversely, female borrowers, level of household income, type of business and borrower's experience had no significant effect on repayment behavior. Chaudhary and Ishafq (2003) examined the credit worthiness of 224 rural borrowers in Pakistan. Using logistic regression, they found that borrowers with higher educational levels, involved in a nonfarm business activity, who were using the loans for investment and were female, had a higher probability of repaying their loan. The study found that the subsidized interest rate level did not have a significant effect on repayment behavior among rural borrowers in Pakistan. They concluded that a subsidized interest rate was not the best way to ensure good repayment by borrowers.

Peter and Keller (2004) find that the ratio of women borrowers within the total clients has relationship with MFIs loan portfolio. They suggest that group lending can significantly improve repayments and therefore reduce risks in loan portfolios. Espallier (2009), study analyzed gender differences with respect to microfinance repayment rates using a large global dataset covering 350 microfinance institutions in 70 countries. The result revealed that more women clients are associated with lower portfolio at risk, lower write-offs and lower credit loss provisions. The study in general revealed that women are a better credit- risk for MFIs, as the effect were stronger for NGO's individual based lenders, finance plus providers and regulated MFIs.

Fofack (2005) study analyzed casual and macroeconomic implication on loan default in sub-Saharan countries. The study used pseudo panel- based prediction models to test real exchange rate appreciation, net interest margins and real interest rate. The study result showed that, macroeconomic stability and economic growth are associated with a declining level of default; whereas average macroeconomic shocks coupled with higher cost of capital and lower interest margins are associated with a rising scope of nonperforming loans. John (2008) examined how performance, both financially and in terms of outreach of MFIs varies with changes in domestic economy of an institution. The data set used for this study was made available through the microfinance information exchange (MIX). The study includes 3258 separate observation from 77 different countries and from this 10 of the countries were included in the study during 1999 to 2006 period. The study finding revealed that there is no significant correlation with changes in any of the microfinance performance indicators and domestic GDP.

R.Srinivasan (2007) addressed the measurement of loan delinquency and default in microfinance institutions (MFIs) in India during 1998 to 2006 period. The paper concluded that the mature i.e. the rate after say a year of operations of MFI current collection rate, portfolio at risk number would not mislead and with improper loan loss provision net portfolio at risk will not reflect delinquency correctively, therefore concluded that the collection rate as useful for estimating delinquency. Romy (2007) analyzed also the impact of institutional characteristics on the default rates of non- profit MFIs. He stated that a focus on women borrowers, on institutional incorporation into the community, and on client led programing all lead to lower default rates and thus greater success

Jackle (2013) analyzed micro and macro indicators of MFIs portfolio quality. He noted that PAR over 30 days is statistically significant driven by its own past trend, size of gross loan portfolio and how it grows, operational self- sufficiency, loss provisioning and write- off policy, amount of female borrowers and the degree of loan monitoring on the micro side and on macro side indicators (inflation rate, the labor force participation rate and depth of financial system as important. Letenah (2009) find also that large and small MFIs are allocating more loan loss provision expense than the industry average and the related portfolio at risk is high for these MFIs and microfinance age correlated positively with efficiency and productivity.

ERIC (2015), was examine the effect of loan portfolio quality on financial performance of selected universal bank in Ghana selected from '10' Ghanaian bank for the period of (2007 to 2015) this study employed panel regression technique with aid of statistical software .the dependent variable of this study was financial performance it have independent variables such as return on equity ,net interest margin, loan portfolio, profitability, loan loss provision to gross loan advance and cost income ratio. The result from analysis indicate that loan loss provision to gross loan advance has negative effect on financial performance of bank in Ghana in addition the finding of study indicate that net interest margin has positive effect on financial performance, the further established that firm size has positive effect on financial performance finally that cost to income ratio has negative significant effect on the financial performance.

(Vasiliki, 2012), was examined Determinant of loan quality on the performance from '11' cooperative banks in Ghana for the period of 2003-2014 this study employed a dynamic regression technique was used. the dependent variable of this study is loan quality and it have independent variables such as loan loss reserves as percentage of total asset , bank capital and reserves to total asset ,bank liquidity, return on asset, local un employment rate ,GDP growth rate ,average inflation rate and public debt as percentage of GDP .the result from analysis indicate that loan loss reserves to total asset have positive relationship with loan quality ,bank capital and reserves to total asset have positive or negative relationship with loan quality, bank liquidity and total loan to total asset are positively affect loan quality, return on asset and loan quality has negative relationship ,local un employment rate are positively affect loan quality ,GDP growth rate has negative impact on loan quality ,average inflation has positive or

negative relationship with loan quality and public debt as percentage of GDP has positive relationship with loan quality.

(Faicalbelaid,2014), this study was examine the loan quality determinant, evaluating the contribution of bank specific variables macroeconomic factors macroeconomic factors and firm level information from '10' selected largest Tunisian bank for the period of analysis(2001-2010).the study used regression analysis framework using ordered probity model problem loans is dependent variable of this study and it have independent variables such us cost inefficiency, capitalization ,diversification size and profitability. this analysis show there is positive relationship between cost inefficiency and problem loans, capitalization has negative relationship with problem loan ,diversification are negative effect on loan problem in addition size has positive relationship with problem loan and profitability has positive or negative relationship with problem loans.

2.3. Summary of literature and Literature Knowledge Gap

The study was intended to identify major determinants of loan portfolios quality which are not included in previous studies and enhance the finding and fill the problem of missing important variables in previous studies. In an attempt to fill this gap the study intends to examine the determinant of loan portfolio quality in large microfinance institution by using dependent variable portfolio at risk over 90 day (PAR-90) and independent variables such as; size, operating expense ratio, leverage (debt to equity ratio), deposit to loan, gross loan portfolio to total asset ratio and return on equity.). In general, the lack of sufficient research on the determinants of microfinance loan portfolios quality in the context of Ethiopia and the existence of knowledge gap in the area initiate this study

CHAPTER THREE

3. RESEARCH METHODOLOGY

Introduction

This chapter describes the research methodology. It identifies the type of study to be carried out, the research methodology and the reasons for such a methodology. Besides, this chapter unveils details and justifies the methods to be followed in achieving the set objectives of the study. The chapter begins with the area study and then goes on research design study approach and type data is therefore explained. The data analysis tools and techniques are detailed and the sample and sources of data for the study are explained finally.

3.1 Area of the Study

The study was conducted on Determinant of loan portfolio quality in large micro finance institution located in Ethiopia.

3.2 Research design

Research design is an arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. In fact, the research design in the conceptual structure with in which research is conducted; it consists of the blue print for the collection, measurement and analysis of data (CR. Kothari -2009). From different categories of research design studies, researcher was use Explanatory study approach because this research was examine different aspects of a described situation or event simultaneously in large micro finance institution. The research seeks to empirically find out the determinants of loan portfolio quality in large micro finance institution that found in Ethiopia considering the period of 2005 to 2014. The nature of the study is quantitative and it employs a panel data that is pooling of time series and cross sectional observations. There are important advantages to make full use of this rich structure. First, and perhaps most importantly, researcher can address a broader range of issues and tackle more complex problems with panel data than would be possible with pure time-series or pure cross-sectional data alone (Chris, 2008).Second, it is often of interest to examine how variables, or the relationships between them, change dynamically (over time). To do this using pure time-series data would often require a long run of

data simply to get a sufficient number of observations to be able to conduct any meaningful hypothesis tests. However, by combining cross-sectional and time series data, one can increase the number of degrees of freedom, and thus the power of the test, by employing information on the dynamic behavior of a large number of entities at the same time. The additional variation introduced by combining the data in this way can also help to mitigate problems of multicollinearity that may arise if time series are modeled individually.

Finally, as was become apparent below, by structuring the model in an appropriate way, we can remove the impact of certain forms of omitted variables bias in regression results (Chris. B, 2008).

3.3 Model Specification

The nature of the study is quantitative accordingly the literature suggest six indicator of portfolio at risk over '90' days therefore size operating expense ratio, leverage(debt to equity) ratio, deposit to loan, gross loan portfolio to total asset and return on equity. Panel regression models were run in order to show their relationship.

$$PAR\text{-}90days_{i,t} = \beta_0 + \beta_1 LnTA_{i,t} + \beta_2 OPEXP_{i,t} + \beta_3 LEV_{i,t} + \beta_4 DTL_{i,t} + \beta_5 (GLP/TA)_{i,t} + \beta_6 ROE_{i,t} + \varepsilon\varepsilon i,t1$$

i=micro finance index

t=year index

LnTA=size

OPPEXP =operating expense ratio

LEV =leverage (debt to equity ratio)

DTL=deposit to loan ratio

GLP/TA=gross loan portfolio to total asset

ROE=return on equity

3.4 Data Source and Method of Data Collection

This study was mainly based on secondary data from the annual financial reports of large MFIs, data from books, journals, newspapers, magazines, and reports of various governmental and nongovernmental organizations such as AEMFI (Association of Ethiopian Micro Finance Institutions). To increase the reliability of data, audited annual reports were used. Besides, crucial information was obtained from apex authority controlling the performance of Microfinance Institutions that is, the National Bank of Ethiopia.

3.5 Population, Sample and Sampling Techniques

3.5.1 Sample Frame

The sample frame is the list of total population. The sample frame in this study was all those .Large Microfinance institutions (25 large MFIs as of 2014) operating in the country (National Bank of Ethiopia, 2016).

3.5.2 Sample Size and Sampling Techniques

The sampling) technique used in this research is a non-probabilistic sampling(judgmental sampling non-probability sampling is sampling technique in which some units of the population have zero chance of selection or where the probability of selection cannot be accurately determined rather samples are selected based on certain non-random criteria, such as quota or convenience. Among the non-probabilistic sampling methods, this research uses purposive sampling. As stated by Saunders et al (2009), purposive sampling is often used when working with small samples and when we select cases that are particularly informative. Thus the researcher used purposive sampling by considering the availability of full data for the selected time period. In Ethiopia, there are 25 large macro finance institution. Among that around16 large macro finance of them have more than 10 years of data. In order to have balanced panel data for ten years, those large micro finance institution which have less than ten years in operation are not selected for this study. Therefore, 10 large micro finance institutions were selected and it was possible to draw a relationship among variables using 100 observations (10 large MFIs 10 year's data) the time period covered is from 2005 to 2014.

3.6 Method of Data Analysis

The study was used descriptive statistics for data analysis. Descriptive statistics for dependent variables and all independent variables is used to check whether there is a significant variation in the data set. A correlation statistics is also needed to observe the direction and magnitude of relations among variables. The estimations are made using pooled ordinary least squares and random effect generalized least squares regression**.**

CHAPTER FOUR

DATA ANALYSES AND DISCUSSION OF RESULTS

Introduction

In presenting findings and discussion of the data, this chapter is organized in a way to meet the broad research objective and to answer the research questions. First, the findings that answer the research questions are presented to show the relationship of the independent variables to dependent variables. In this chapter the data collected were presented and important correlation and regression analysis findings were discussed.

This chapter has five sections. In the first section 4.1, the descriptive statistics of the data has been described very well, in section 4.2 correlation analysis had been conducted, and under section 4.3 presents the regression results.

4. 1 Descriptive Statistics

Table 1 presents descriptive statistics i.e. mean, standard deviation, minimum and maximum values of variables which are involved in the regression models. This was generated to give overall description about data used in the model and served as data screening tool to spot unreasonable figure. The explained dependent variable is portfolio at risk over 90 day and others independent variables. They are: deposits to loans ratio (DTL), return on equity, debt to equity (lev), gross loan portfolios to total asset (GLP /TA), size (LnTA) and operating expenses ratio (opex). To show the brief overview of the data, the researcher presents the following Table 4.1 which contains the descriptive statistics of variables of large micro finance institution that operate in Ethiopia from 2005 to 2014.

Table 4. 1 Descriptive Statistics of Dependent and Independent Variables

Variables	PAR90	DTL	ROE	LEV	GLP	SIZE	OPEX
Mean	0.0566	0.00204	0.1992	2.5787	0.5209	7.901646	0.09413
Median	0.06	0	0.23	2.595	0.585	7.95251	0.085
Maximum	0.08	0.01	0.254	3.167	0.832	8.490424	0.165
Minimum	0.04	-0.0077	0.13	2.1	0.31	7.127924	0.04
Std. Dev.	0.013167	0.0055	0.050752	0.299824	0.174562	0.418486	0.037253
Observations	100	100	100	100	100	100	100

Source: The Researcher computation through Eviews 7

Portfolio at risk over 90 day is computed by dividing the outstanding balance of all loans with arrears over 90 days by the adjusted gross loan portfolio as of a certain date it have mean of *PAR-90 days* is 5.66%, whereas the minimum, maximum and standard deviation are 4% , 8% and 1.31%, respectively. The mean shows that on average, the sampled microfinance institutions had recorded 5.66% of portfolio at risk over 90 days over 2005 to 2014, deposits to loans ratio is computed by dividing voluntary savings over the adjusted gross loan portfolio it is an important indicator for MFIs that mobilize deposits it have 0.20% mean value and 0.55% standard division whereas the minimum and the maximum are-0.77% and 1.0%, respectively.

The Return on equity (ROE) is the net operating income less taxes as a percentage of total equity. The ratio indicates MFIs ability to build equity, it has19.9%, 5.07%, 13%, 25% mean, standard division, minimum and maximum value respectively. The debt to equity ratio is calculated by dividing total liabilities to total equity it have 257.8%mean,29.9% Standard division and 210%,316% minimum and maximum value respectively. Gross loan portfolio to total asset is calculated by adjusted total liabilities over adjusted total equity and has 52% mean,17.5%Standard division,31% minimum and83.2% maximum value. Firm size (LnTA) is defined as natural logarithm of total assets, It implies possession of more resources it have 790%,41.84% 712%and 849% mean, Standard division minimum and maximum value. The operating expense ratio is calculated by dividing all expenses related to the operation of MFI (including all the administrative and salary expenses, depreciation and board fees) by the average

gross portfolio having 9.4% mean,3.72% Standard division,4% minimum and16.5% maximum value.

4.2. Correlation Coefficients

The correlations obviously show direction and strength of association between variables and it is a precondition to run regression. As known correlation analysis is the type of analysis that measures the relationship between two items. The value of correlation coefficient of the analysis result indicates if changes in one item results in changes in the other item. And it is a way to index the degree to which two variables are associated with or related to each other.

Table 4.2 correlation analysis

VARI	PAR90	DTL	ROE	LEV	GLP	SIZE	OPEX
PAR90	1						
DTL	-0.65253	1					
ROE	0.93532	-0.72199	1				
LEV	0.053624	-0.43482	0.349233	1			
GLP	0.250652	-0.75172	0.477444	0.712312	1		
SIZE	0.49251	-0.77063	0.679653	0.78179	0.758158	1	
OPEX	-0.39986	0.790183	-0.48417	-0.46941	-0.59171	-0.67512	1

Source: The Researcher computation through Eviews 7

Table4. 2 presents correlation coefficients for all models in which portfolios at risk over 90 days (PAR -90 days) are used as proxies for loan portfolios quality The positive significant correlation with dependent variables argues that a firm with higher portfolio at risk over 90 days. Size

(LnTA) has positively and weakly related to portfolio at risk over 90 day it implies the larger firms are

More likely to reduce portfolios risk because they have more economics of scale, hiring qualified employees and strong control over its loan products Operating expense ratio (OPEX) has negatively and significantly related to portfolio at risk over 90 days. It shows operating expense ratio has negatively effect on MFIs loan portfolio quality. Similarly debt to equity (lev) has positively and insignificantly related with portfolio at risk over 90 days. There is a negatively and insignificantly association between deposits to loan portfolios (DTL) and portfolios at risk over 90 days similarly there is positively and weakly relationship between Gross loan portfolio to total asset(GLP/TA) and portfolio at risk over 90 day it implies minimum amount of outstanding principal balance of all of MFI's outstanding loans, Return on equity (ROE) has significantly and strongly related to portfolios at risk over 90 day.(ROE) is a proxy for firm profitability; therefore, firms that are more profitable would significantly reduce portfolios risk because they have a competitive advantage, relatively use available technology and strong systems relation.

4.3. Regression result

The regression model assumes the linearity of the parameter since the model applies linear ordinary least square (OLS). The main objective of the model is to predict the strength as well as direction of association among the dependent and independent variables. Accordingly, in order to maintain the validity and robustness of the regression result of the research in CLRM, it is better to satisfy basic assumption of CLRM.

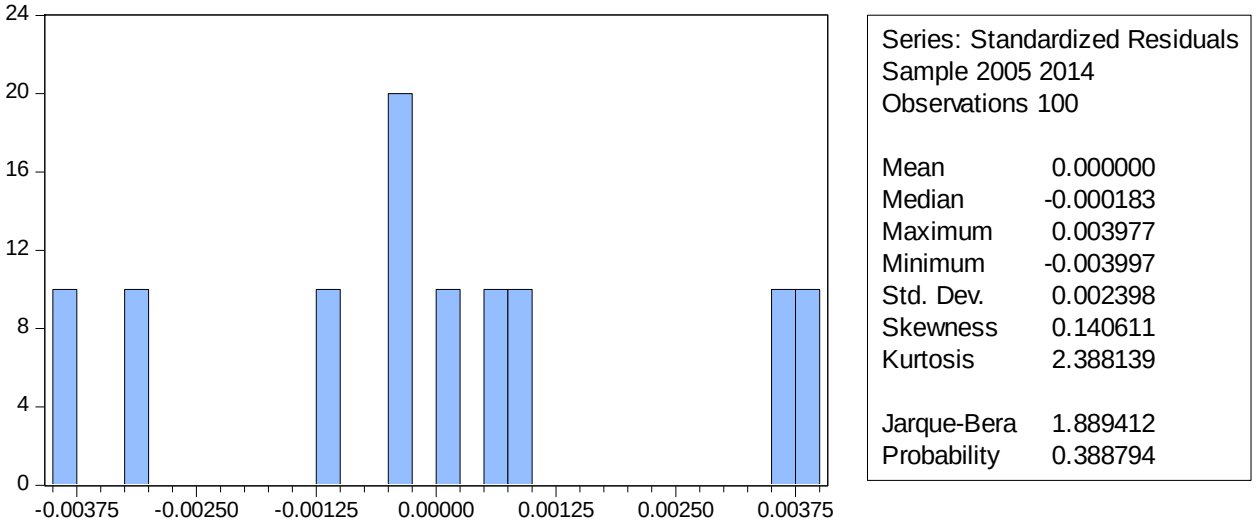
When these assumptions are satisfied, all available information are used in the model. One the contrary, if these assumptions are violated, there will be data that left out of the model (Brooks, 2008). Therefore, before using the model for testing the significance of the slopes and analyzing the regressed result, normality, multicollinearity, autocorrelation and heteroscedasticity tests are checked for identifying misspecification of data if any so as to fulfill research quality.

4.3.1Normality Test

In this research is the normality assumption (i.e. the normally distributed errors). Brooks (2008) stated that the normality assumption '($u_t \sim N(0, \sigma^2)$)' is required in order to conduct single or joint

Hypothesis tests about the model parameters. To check this normality assumption, the most commonly applied tests is the Jarque-Bera (JB) test. This test uses the property of a normally distributed random variable that the entire distribution is characterized by the first two moments - the mean and the variance (Brooks, 2008, p.161). In case of this study, the researcher used JB normality test to test the null hypothesis of normally distributed errors assumptions.

Table 3 normality test



Source: The Researcher computation through Eviews 7

As shown in the histogram in the appendix here above, kurtosis is around 3 (i.e. 2.388139) skewness is around '0' (0.140611) the Histogram statistics was not significant at 5% (i.e. 0.388794). Hence, the null hypothesis that is the error term is normally distributed should not be rejected and the error term in all of the cases follows the normal distribution and skewed to the right.

4.3.2 Heteroscedasticity Test

Heteroscedasticity test is one of the diagnostic tests of OLS conducted for this study. This theoretically expressed as by Brooks (2008,) ‘’var (ut) = $\sigma 2 < \infty$; it has been assumed that the variance of the errors is constant, $\sigma 2$. One of the basic assumptions for the classical linear regression model is Homoscedasticity assumption that states as the probability distribution of the disturbance term remains same for all observations. That is the variance of each ui is the same for all values of the explanatory variable. If the disturbance terms do not have the same variance or non-homogeneity of variance it is called heteroscedasticity (Bedru and Seid, 2005). This

Assumption was tested by white test. It tests the null hypothesis that variance is constant If p value shows insignificant ($p > 0.05$), the null hypothesis would be accepted and the variances are homogenous. In contrast, if the p- value is significant ($p < 0.05$), the null hypothesis would be rejected and it implies a heteroscedasticity concern.

Table 4.4 Heteroscedasticity test

Heteroscedasticity Test:
White

F-statistic	0.604876	Prob. F(21,76)	0.9028
Obs*R-squared	14.03383	Prob. Chi-Square(21)	0.8681
Scaled explained SS	153.5238	Prob. Chi-Square(21)	0.0000

Source: The Researcher computation through Eviews 7

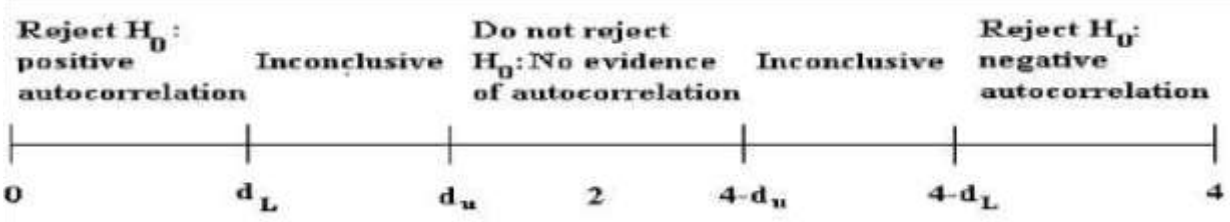
As shown in the above white test, there is no heteroscedasticity problem for this study hence the p- value is 0.604876 indicates insignificant value assumption of Homoscedasticity.

4.3.3 Autocorrelation Test

According to Chris brooks (2008), assumption three said that the CLRM‟s disturbance terms are the covariance between the error terms over time (or cross-sectional, for that type of data)is zero. In other words, it is assumed that the errors are uncorrelated with one another. In addition he said that if the errors are not uncorrelated with one another, it would be stated that they are "auto correlated" or that they are "serially correlated". To test this assumption the Durbin– Watson (DW) statistical test was applied.

Durbin Watson (DW) is a test for first order autocorrelation, i.e. it tests only for a relationship between an error and its immediately previous value. DW is approximately equals to $2(1 - \hat{\rho})$, where $\hat{\rho}$ is the estimated correlation coefficient between the error term and its first order lag (Brooks 2008). The null hypothesis for the DW test is no autocorrelation between the error term and its lag. According to Brooks (2008), the DW test does not follow a standard statistical distribution such as a t, F, or $\chi 2$. DW has 2 critical values: an upper critical value (dU) and a lower critical value (dL), and there is also an intermediate region where the null hypothesis of no autocorrelation can neither be rejected nor not rejected. The rejection, non-rejection, and inconclusive regions are shown on the number line in figure 4.3 Rejection and non-rejection regions for DW test Reject H0: Positive Autocorrelation Inconclusive Do not reject H0: No evidence of Autocorrelation Inconclusive Reject H0: Negative Autocorrelation.

Table 4.5 Autocorrelation Test: Durbin Watson



The null hypothesis is rejected and the existence of positive autocorrelation presumed if DW is less than the lower critical value (dL); the null hypothesis is rejected and the existence of negative autocorrelation presumed if DW is greater than 4 minus the lower critical value (4-dL); the null hypothesis is not rejected and no significant residual autocorrelation is presumed if DW

is between the upper critical value (dU) and 4 minus the upper critical limits (4-dU) (Brooks 2008). This study have six explanatory variables (k) one hundred observations and as per the DW table in Appendix-IV for 100 observations with six explanatory variables at 1% level of significance, the dL and dU values are 1.421 and 1.670 respectively. Accordingly, the value of 4dU and 4-dL are 2.33and2.579, respectively. The DW values of PAR90 2.038731 so no evidence of autocorrelation region where the null hypothesis of and no autocorrelation do not be rejected.

4.3.4 Multicollinearity Test

Multicollinearity test is conducted to identify the correlation between explanatory variables and to avoid double effect of independent variable from the model. Table 4.3 described correlation among explanatory variables. Correlation is a single number that describes the degree of relationship between two variables. According to Gujarati (2004), the standard statistical method for testing data for multicollinearity is analyzing the explanatory variables correlation coefficients (CC); condition index (CI) and variance inflation factor (VIF). Therefore, in this research correlation matrix for six of the independent variables shown below in the table had been estimated.

Table 4.6 Correlation Matrix of Explanatory Variables

Variables	DTL	ROE	LEV	GLP	SIZE	OPEX
DTL	**1**					
ROE	-0.72199	1				
LEV	-0.43482	0.349233	1			
GLP	-0.75172	0.477444	0.712312	1		
SIZE	-0.77063	0.679653	0.78179	0.758158	1	
OPEX	0.790183	-0.48417	-0.46941	-0.59171	-0.67512	1

Source: The Researcher computation through Eviews 7

The results in the above correlation matrix show that the highest correlation of 79.02%exists between operating expense and debt to loan ratio. Based on the result indicated in the above table, the researcher proves there is no multicollinearity problem in this study since there

no correlation among the explanatory variables which is more than 80% according to Berry and Feldman (1985).

4.4 Random effect versus fixed effect module

The method used to decide whether fixed effect or random effect model was Housman Specification Test. The Housman Specification Test identifies whether fixed-effects or random effect model is the most appropriate to the model which used in the study. The null hypothesis of Housman Test is use Random effect model that means if the null hypothesis is rejected Fixed Effect model is appropriate for the study.

Table 4.7correleted random effect module

Correlated Random Effects - Housman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	6	1.0000

Source: The Researcher computation through Eviews 7

As shown from the Housman specification test for this study has a p-value of 1.0000for the regression model. This indicates that p-value is insignificant at 5% and then the null hypothesis is accepted and the alternate hypothesis i.e. random effect model is appropriate for the given data set in this study.

4.5. Multiple Regression Analysis

This analysis presents over all the empirical results of the regressions. The entire regression result was made and coefficients of the variables were estimated by Eviews software version 7. As stated earlier in this study Random Effect regression model is used and it is an appropriate based on Housman test. Thus, the random effect model used to examine the determinant of loan portfolio quality in large MFIs in Ethiopia.

Table 4. 8 Multiple Variables Regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.013651	0.011267	1.211558	0.2291
LEV	-0.012595	0.002221	-5.671116	0.0000*
SIZE	0.004384	0.001769	2.477919	0.0152**
ROE	0.239737	0.009827	24.39523	0.0000*
DTL	-0.393581	0.170908	-2.302878	0.0238**
GLP	-0.013783	0.005033	-2.738204	0.0075*
OPEX	0.010750	0.014568	0.737912	0.4626
	Effects Specification			
Cross-section fixed (dummy variables)				
R-squared	0.966843	Mean dependent var		0.056600
Adjusted R-squared	0.960922	S.D. dependent var		0.013167
S.E. of regression	0.002603	Akaike info criterion		-8.918741
Sum squared resid	0.000569	Schwarz criterion		-8.501913
Log likelihood	461.9370	Hannan-Quinn criter.		-8.750043
F-statistic	163.2943	Durbin-Watson stat		2.078745
Prob(F-statistic)	0.000000			

*, ** and *** denote significance at 1%, 5%, and 10% levels, respectively Source: The Researcher computation through Eviews 7

The above regression result shows determinant loan portfolio quality in large MFIs which is measured by PAR-90 as explained variable and the explanatory variables of deposit to loan ,return on equity, leverage gross loan portfolio to total asset, size and operating expense ratio. As known R-squared statistics and the adjusted-R squared statistics of model was 96.68% and

96.1% is the power of the explanatory variables that represent the explained variable i.e. (PAR90) respectively. The result indicates that the changes in the explanatory variables explain 96.1% of the changes in the explained variable which is a good result to represent the model. The F-statistics tests of this regression model is 163.2943 which indicates that the null hypothesis that all of the slope parameters (βs‟) are jointly zero. In the above case p-value of zero attached to the F- statistic shows that this null hypothesis should be rejected even at 1% level of significance. The above table also depicts that, debt to equity (LEV) has statistically positively significant influence on portfolio at risk over 90 day at (p< 1%) significant level. The other statistically significant variables, size has positive significance influence on portfolio at risk over 90 day at (p<5%) significant level. The other it can be seen that return on equity (ROE) has positive significance impact on portfolio at risk over 90 day at (p<1%) It depicts that a MFI with higher return on equity ratio more tends to have lower portfolios risk. Since the return on equity is a proxy for profitability, deposit to loan (DTL) has positive significant influence on portfolio at risk over 90 day at (p<5%) significant level High ratio of deposit to loan implies liability to the institution. In other ways, an institution with high deposits volume would have more capacity to provide financial services. Gross loan portfolio to total asset (GLP/TA) has positive significance impact on portfolio at risk over 90 day at(p<1%) significant level the other variable it can be seen that operating expense ratio(OPEX) has not significantly influence portfolio at risk over 90 day. Return on equity, deposit to loan, debt to equity, and gross loan portfolio to total asset are statistically significant factors that affecting theMFIs loan portfolio quality.

The coefficient of explanatory variables affect portfolio quality negatively, there are; DTL, LEV, and GLP are variables increased in the MFIs have a -0.39, -0.012, and -0.013unit change on MFIs loan portfolio quality to the opposite direction respectively. However, size ROE and OPEX had a positive impact on PAR-90. From the above regression appendix 3 terms of significance level (corresponding p-value) only operating expense ratio have more than the selected significance level 0.4626. Opposing to the researcher`s expectation, so did not show any significant impact on the level of PAR-90 of large macro finance institution in Ethiopia from year 2005-2014.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary and Conclusions

This study examines determinants of loan portfolio quality in large MFIs as measured by Portfolio at risk over 90-days (PAR-90 days) and by using 10 years data of 10 large Ethiopian microfinance institutions over the period 2005 to 2014. Based on the pooled ordinary least squares (OLS) and random effects generalized least squares.

The study finds an institution size (LnTA) is positively and significantly influences portfolios at risk over 90 days (PAR-90days),). It implies that large MFIs can operate at low costs due to scale and scope of economies advantages, possess a larger pool of qualified human capital and have a greater chance for strategic diversification. The result suggests that large MFIs with long operating life have low portfolios risks. This might be because of there is strong procedures in screening, monitoring and collection of loan portfolios.

Deposit to loan ratio (DLT) negatively and significantly influences portfolios at risk over 90 days (PAR 90 days). Low ratio of deposit to loan implies low liability to the institution. In other ways, an institution with high deposits volume would have more capacity to provide financial services. While providing loans, MFIs require the borrowers to save a specified amount of money (obligatory savings) on frequently basis. Accordingly, the borrowers should save some amount of money, which may limit their capacity to run the business as well.

The positive and significant coefficient on gross loan portfolios to total asset (GLP/TA) with portfolios at risk over 90 days (PAR 90 days),the researcher argues the large MFI with more diversified loan portfolios would less likely to have portfolios risk.

Return on equity (ROE) has significant and negative impact on portfolios at risk over 90 days (PAR 90 days). It depicts that a MFI with higher return on equity ratio more tends to have lower portfolios risk.

5.2. RECOMMENDATION

The major objective of large microfinance institutions is the provision of financial service to the poor people who have no financial service access from banks and cannot provide qualified collateral to get loans. Particularly the institutions empower women entrepreneurs in group by providing loans to them. To do so, the loan portfolios should be secured in order to reach more number of low income group societies in financial services. Unless the loans paid on the maturity or contract date, the institution could not make loan available to others. Accordingly, the institutions may face default risks. With this fact in mind, the researcher forwards the following recommendations based on the findings.

- First, natural logarithm of the total assets found as important determinant portfolio quality of large MFIs. The result shows that larger MFIs have more capacity to reduce the risk. Therefore, the study recommends that the microfinance institutions should give considerable attention to their loan products as total assets increase to get the advantage of size to reduce the risk.
- The operating expenses ratio the proxy for efficiency appeared as important determinant. The lower ratio implies more efficiency and vice versa, but the regression result shows a positive sign means as the ratio gets up, the portfolios risk will rise . With this regard, the study recommends that the institution should take into attention to reduce operating expenses and see its effects on loan portfolios quality.

- Second, the study found the strong effect of deposit to loan ratio on portfolios at risk over 90 day Deposit to loan ratio shows positive coefficient suggesting that as the ratio increases, the risk would also increase. One of the reasons might me involuntary savings by the borrowers. Practically, a business incurs losses at the early stages because marketing cost would high; therefore, if the borrowers should save back a specified amount of money borrowed at an interval time, they may feel lack of enough capital to run their business as well and thus, in short period they will liquidate the business and fail to repay loan.

Therefore, the MFIs should do enough emphasis while setting the amount and interval period for involuntary savings by borrowers.

- Gross loan portfolios to total assets (GLP/TA) reflect assets diversified which recommended in reducing loan risk. This is the advisable device in portfolios management so that large MFIs could have a diversified their loan products which would significantly reduce risks.

- Return on equity also thought as major determinants of loan portfolios quality the coefficient on the return equity is also hope giving to increase portfolios quality. Therefore, working more to increase return on equity ratio assists to reduce portfolios risk.

In general. There are important determinant variables suggested in literature but not included in the models of the study, for example, method of lending (group lending, individual lending), management related factors (internal control over loan products), technology, etc. Therefore, further study would use these variables and see their effects on portfolios quality.

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Appendix I- Regression Result

Dependent Variable: PAR90
Method: Panel Least Squares
Date: 06/04/19 Time: 06:32
Sample: 2005 2014
Periods included: 10
Cross-sections included: 10
Total panel (balanced) observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.013651	0.011267	1.211558	0.2291
LEV	-0.012595	0.002221	-5.671116	0.0000*
SIZE	0.004384	0.001769	2.477919	0.0152**
ROE	0.239737	0.009827	24.39523	0.0000*
DTL	-0.393581	0.170908	-2.302878	0.0238**
GLP	-0.013783	0.005033	-2.738204	0.0075*
OPEX	0.010750	0.014568	0.737912	0.4626
	Effects Specification			

Cross-section fixed (dummy variables)

R-squared	0.966843	Mean dependent var	0.056600
Adjusted R-squared	0.960922	S.D. dependent var	0.013167
S.E. of regression	0.002603	Akaike info criterion	-8.918741
Sum squared resid	0.000569	Schwarz criterion	-8.501913
Log likelihood	461.9370	Hannan-Quinn criter.	-8.750043
F-statistic	163.2943	Durbin-Watson stat	2.078745
Prob(F-statistic)	0.000000		

Appendix II- Heteroscedasticity test

Heteroskedasticity Test: White

F-statistic	0.604876	Prob. F(21,76)	0.9028
Obs*R-squared	14.03383	Prob. Chi-Square(21)	0.8681
Scaled explained SS	153.5238	Prob. Chi-Square(21)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 06/05/19 Time: 04:55
Sample: 2005 2104
Included observations: 98

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.011736	0.043277	0.271194	0.7870
LEV^2	-6.80E-05	0.001590	-0.042775	0.9660
LEV*GLP	-0.024705	0.024487	-1.008901	0.3162
LEV*DTL	-0.048269	0.151105	-0.319442	0.7503
LEV*ROE	-0.042544	0.050358	-0.844832	0.4009
LEV*SIZE	0.002133	0.001660	1.284832	0.2028
LEV*OPEX	0.003924	0.098670	0.039764	0.9684
GLP^2	0.004560	0.033713	0.135273	0.8928
GLP*DTL	1.004217	1.032020	0.973060	0.3336
GLP*ROE	0.320313	0.253345	1.264332	0.2100
GLP*SIZE	-0.006768	0.010211	-0.662769	0.5095
GLP*OPEX	0.285130	0.757498	0.376411	0.7077
DTL^2	-0.012183	0.035451	-0.343655	0.7321
DTL*ROE	0.852357	0.875988	0.973023	0.3336
DTL*SIZE	-0.029125	0.035928	-0.810662	0.4201
DTL*OPEX	-0.762570	6.871950	-0.110968	0.9119
ROE^2	0.091279	0.071370	1.278962	0.2048
ROE*SIZE	-0.006521	0.015108	-0.431604	0.6673
ROE*OPEX	-0.367890	1.480311	-0.248522	0.8044
SIZE^2	-0.000117	0.000642	-0.181548	0.8564
SIZE*OPEX	0.030477	0.063703	0.478419	0.6337
OPEX^2	-1.733241	2.329162	-0.744148	0.4591

R-squared	0.143202	Mean dependent var	0.010820
Adjusted R-squared	-0.093544	S.D. dependent var	0.054190
S.E. of regression	0.056668	Akaike info criterion	-2.708473
Sum squared resid	0.244055	Schwarz criterion	-2.128174
Log likelihood	154.7152	Hannan-Quinn criter.	-2.473754
F-statistic	0.604876	Durbin-Watson stat	2.078745
Prob(F-statistic)	0.902830		

Appendix III: - Housman Test

Correlated Random Effects - Housman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	6	1.0000

* Cross-section test variance is invalid. Hausman statistic set to zero.
** WARNING: estimated cross-section random effects variance is zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LEV	-0.012595	-0.012595	-0.000000	NA
SIZE	0.004384	0.004384	0.000000	1.0000
ROE	0.239737	0.239737	0.000000	1.0000
DTL	-0.393581	-0.393581	-0.000000	NA
GLP	-0.013783	-0.013783	0.000000	1.0000
OPEX	0.010750	0.010750	0.000000	1.0000

Cross-section random effects test equation:
Dependent Variable: PAR90
Method: Panel Least Squares
Date: 06/05/19 Time: 05:33
Sample: 2005 2014
Periods included: 10
Cross-sections included: 10
Total panel (balanced) observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.013651	0.011267	1.211558	0.2291
LEV	-0.012595	0.002221	-5.671116	0.0000
SIZE	0.004384	0.001769	2.477919	0.0152
ROE	0.239737	0.009827	24.39523	0.0000
DTL	-0.393581	0.170908	-2.302878	0.0238
GLP	-0.013783	0.005033	-2.738204	0.0075
OPEX	0.010750	0.014568	0.737912	0.4626

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.966843	Mean dependent var	0.056600
Adjusted R-squared	0.960922	S.D. dependent var	0.013167
S.E. of regression	0.002603	Akaike info criterion	-8.918741
Sum squared resid	0.000569	Schwarz criterion	-8.501913
Log likelihood	461.9370	Hannan-Quinn criter.	-8.750043
F-statistic	163.2943	Durbin-Watson stat	3.042549
Prob(F-statistic)	0.000000		