The effect of Credit Risk Management on Financial Performance:Evidence from Selected Micro Finance Institution in Eastern Ethiopia.

DIRE DAWA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ACCOUNTING AND FINANCE

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By

OSMAN ALI AHMED DDU1300385

Under the Guidance of

Tadesse D. (PHD)

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The effect of Credit Risk Management on Financial Performance: (Evidence from Selected Micro Finance Institution)

OSMAN ALI AHMED

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In Partial Fulfillment of the Requirements for the Masters of Science Degree in Accounting and Finance

(Masters of Science Degree in Accounting and Finance, 2022)

Declaration

This is to certify that the paper prepared by Osman Ali entitled: The effect of Credit Risk Management on Financial Performance: (Evidence from Selected Micro Finance Institution) and submitted to department of accounting and finance in partial fulfillment of the requirement of the Degree of Masters of science in accounting and finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Declared by

Name: Osman Ali **ID. No:** DDU1300385

Signature: _____

Date: October, 2022

Area: Dire Dawa, Ethiopia

Advisor: TadesseDemeke (PHD)

Signature: _____

Date: _____

Dire Dawa University

School of Graduate Studies

Final Thesis Approval Sheet

Board of Examiners and Advisor

Name of the Candidate: Osman Ali **ID. No:** DDU1300385

Title of the Thesis: The effect of Credit Risk Management on Financial Performance: (Evidence from Selected Micro Finance Institution We, the undersigned, members of the Board of Examiners, have read the thesis and evaluated the final open defense of the candidate. The Thesis is written for partial fulfillment of the requirements for the degree of Master of Science Degree in Accounting and Finance

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Abbreviations and Acronyms

CAR	Capital Adequacy Ratio
CD	Diversification
CR	Credit Risk
CS	Credit scoring
MFIs	Micro Finance Institutions
NBE	National bank of Ethiopia
NPLR	Non-Performing Loans Ratio
ROA	Return on asset
ROE	Return on equity
ROI	Return on investment

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Abstract

The main purpose of the study was to The effect of Credit Risk Management on Financial Performance of selected micro finance institution in eastern Ethiopiafrom 2006/07-2020/21.The study only uses the quantitative approach and explanatory research design. In the model the researcher defined ROA as performance indicator while diversification, capital adequacy ratio, credit risk, credit scoring and non-performing loans ratio as credit risk management indicators. Data was obtained from secondary sources primarily from annual report of selected micro institutions. Correlation and regression analysis were conducted to determine relationship between dependent and independent variables. The finding of study shows capital adequacy ratio, non-performing loans ratio, and credit scoring had found statistically significant factor to determine performance of selected micro finance institutions during study period. Among those variables the capital adequacy ratio is have positive effect on financial performance. On the other hand, among the five explanatory variables, two measure of credit risk management named as diversification and credit risk has found to be statistically insignificant predictor of ROA. This study recommended managers of selected-micro finance institutions to reduce non-performing loans by using; group lending, standing notifications, continuous monitoring and legal procedures. To attain better performance in micro finance institution could focus in activities that guard the credit of institution. Before extending credit they should carefully assess creditworthiness of their customer and monitor up to full repayment of their debt.

Key words:credit risk, risk management, return on asset, micro-finance institution.

CHAPTER ONE

INTRODUCTION

This chapter presents background to the study,overview offinancial institution in Ethiopia, statement of the problem, objectives of the study andthehypothesisof the study. Moreover, thechapteralsopresents the significanceofthestudy, scope of the study, limitationsofthestudy and organization of the study.

1.1Background of the Study

In modern world, many financial institutions play the role of a financial intermediary. That is, they help to connect borrowers with financial deficit and lenders with excess of funds. The financial sector in all economy is made up of the micro finance and Bank-based system where provision and control of investments financing are made through the banks on one hand and the stock market where investors enter directly through ownership of various securities. Financial institution plays a key role in improving economic productivity and efficiency by intermediating finance from resource surplus unit to those with better productive investment opportunities (NCA, 2006). Financial institution may also be critical to play key role in trade and payment system by significantly minimizing transaction costs and increasing convenience of fund flow (NCA, 2006).

World Bank defines Micro Finance Institutions (MFIs) as institutions that engage in relatively small financial transactions using various methodologies to serve low income households, micro enterprises, small scale farmers, and others who lack access to traditional banking services CBS (2019). Financial intermediation is of great importance in any economy (Dondo and Ongila 2006). According to Kenya's Poverty Reduction Strategy Paper (PRSP) and vision 2030, the financial sector is expected to play a catalytic role in facilitating economic growth through SMEs. Access to formal credit by small-scale business persons has been quite poor particularly among the low-income category. This is largely as a result of the credit policies associated with loans provided by the formal sector (Ringeera, 2003).

It has been proven that microfinance programs have a great contribution in reducing poverty. More importantly, it has been proven that Microfinance can be viewed as a development strategy

tool by enabling poor entrepreneurs to initiate their own business, teaching them how to protect the capital they have, to deal with risk, and to expand the circle of their economic activities. Availability of a microcredit schemes increases the number of small enterprises, which in turn creates employment opportunities for the poorest and stimulates therefore economic development and social inclusion (Baklouti&Abdelfettah, 2013).

Outset of the recent financial crisis in the world that occurred in 2007 and 2008 along with the credit crunch placed credit risk management into the regulatory focus. Subsequently, supervisory bodies instigated more transparency. This called for financial institutions in the lending business to have comprehensive knowledge of their borrowers (customers) and their associated credit risk (Lybeck, 2011). The new Basel III policies conveyed by BCBS present a superior regulatory burden for banks. The proposed Basel (IV) standards for capital reserves for banks will assist in the mitigation of risk in the occurrence of a financial crisis. It is probable to follow the third Basel accords and more rigorous capital requirements and superior financial disclosure will be required. These Basel accords impose certain minimum capital ratios as a guarantee that banks have a sturdy capital position to guard their solvency in the occurrence of a deep recession. The capital strength ensures that the banks carry on lending even in the depression stage of the business cycle.

Credit creation is the main income generating activity for the micro finance institution but this activity involves huge risks to both the lender and the borrower. MFIs are subjected to a wide array of risks in the course of their operations and generally MFIs risks fall into three categories: financial, operational, and environmental risks (Greuning&Bratanovic, 2009). The risk of a trading partner not fulfilling his or her obligation as per the contract on due date or anytime thereafter can greatly jeopardize the smooth functioning of a MFIs business. On the other hand, an MFI with high credit risk has high bankruptcy risk that puts the depositors in jeopardy. Among the risk that face banks, credit risk is one of great concern to most MFIs authorities and finance regulators. This is because credit risk is one risk that can easily and most likely prompts institutions failure. Credit creation calls for prudent management of the risks associated with it. According to (Chijoriga, 2011) credit risk is the most critical and expensive risk associated with financial institutions and its impact on performance is quite significant compared to any other risk associated to the MFIs as it is a direct threat to solvency of the institution.

As defined by Gregory (2010), credit risk occurs when counterparty is not in a position or is unwilling to meet his or her obligation. It may be distinguished in terms of an actual default or declining of counterparty's credit quality. Owing to the fact that credit risk exposure goes on as the foremost basis of tribulations in financial institutions globally, these institutions draw constructive lessons from these past occurrences. Financial institutions as an overview should have a keen responsiveness of the need to recognize, determine, observe and manage credit risk. Furthermore, these institutions should ensure that their capital is sufficient to counter these risks as well as ensure superior compensation for the risks incurred.

Credit risk management in a financial institution starts with the establishment of sound lending principles and an efficient framework for managing the risk. Adequately managing credit risk in financial institutions is critical for the survival and growth of the financial Institution. In the case of MFIs, the issue of credit risk is greater concern because of the higher levels of risks resulting from some of the characteristics of clients and business conditions that they find themselves in. On the other hand, it involves all means available for humans, or in particular, for a risk management entity. Credit risk management is very important to MFIs as it is an integral part of the loan process. It maximizes micro finance risk, adjusted risk rate of return by maintaining credit risk exposure with view to shielding the MFIs from the adverse effects of credit risk (Tefera, 2011).

The relationship between credit risk and micro finances performance has been the concerns of various studies that prove the credit risk is among the major factors affecting profitability performance of financial institution (Tefera, 2011). Literatures on the context of Ethiopian financial sector documented that credit risk has been major challenges of financial institution performance in Ethiopia (Tekilebirhan, et al., 2010).

One of the major assets of an MFI is the loan portfolio and its quality is a reflection of loan delinquency, establishes projected income and its capacity to augment its outreach, and services to existing customers (Ledgerwood, Earne& Nelson, 2013). Portfolio at risk over 30 days and Non-Performing loans ratio (NPLR) are the key measures of portfolio quality. The performance of a loan portfolio is assessed in terms of the returns generated from the different loan products; which is a factor of the loans financed and the outlay of advancing them. PAR30 may include refinanced, restructured, evergreen, or any other adjusted loans. Most of the loans advanced by

MFIs are deemed high risk for the fact that they do not have collateral and are frequently advanced to a more susceptible and low-income individuals. Regardless of this fact, the repayment rate on MFI loans has in the past proven strong.

Financial performance is the results of any of many different activities undertaken by an organization. Common examples of financial performance include profits, return on investments, operating income, earnings before interest and taxes, and net asset value (Cole, 2004). There are two major reasons as to why organizations should have financial performance measurement. The first one is to produce financial statements at the right time. Secondly, financial statements should be analyzed to produce information about the performance of the scheme, which must be used to improve that performance, (Johnson & Scholes, 2007).

Finally, shorter review literature above can easily be summarized as; credit risk has negative impact on financial institution's wellbeing and it desires strong management over portfolio. Major drawbacks of previous studies will be well defined in next section by considering; diversification, capital adequacy ratio, credit risk, non-performing loan, and credit scoring as explanatory variables and return on asset as dependent variable.

1.2Statement of Problem

In performing intermediary role, it must be realized that MFIs have the potential, scope and prospects for mobilizing financial resources and allocating them to productive investments (Olumuyiwa, 2012). Currently the micro financing business is so sensitive because more of their income (revenue) are going to be generated from credit (loan) given to their customers (Jeoitta Colquitt, 2007). This credit creation process exposes the MFIs to high credit risk which results in loss. Therefore, without understanding major factors affecting lending behaviors of economic banks good performance is unachievable.

A number of studies have been done in both developed and developing countries on credit risk management mainly focusing on large financial institutions such as banks. Most studies in MFIs have focused on their financial performance and the performance of their customers mainly the SMEs (Rukwaro (2000), Kitaka (2006) and Mokogi (2003). These studies among other finding have indicated a high default rates among the MFIs. This is also collaborated by CBK financial guideline (2013) on financial performance of all financial institution. With the growing interest

by SMEs and individuals in borrowing from MFIs, this problem will likely continue to grow especially where appropriate risk management procedures are not applied.

Most studies on credit risk management abroad posit that there is a positive relationship between effective credit risk management and MFIs 'profitability while some of these studies support the notion that there is a negative relationship between them (Alshatti, 2015). Some studies that found a positive relationship between credit risk management and MFIs performance include those of Hosna, Manzura and Juanjuan (2009) who found Non-performing loans indicator affects (ROE) more than capital adequacy ratio, Aruwa and Musa (2012) who found a strong positive relationship between risk components and the MFIs' financial performance, although the direction of the effect is not specified, and Boahene, Dasah and Agyei (2012) who also found a positive relationship between credit risk and MFIs performance.

On the other hand, Musyoki and Kadubo (2012), assessing various parameters pertinent to credit risk management as it relates to MFIs financial performance, found an inverse impact of the parameters under study on micro finance institutions financial performance. This result is duplicated by Kaaya and Pastory (2013) who showed that credit risk indicators negatively affected on the MFIs performance.

As to the researchers knowledge and possible searching, few studies conducted in the area of MFIs found in eastern Ethiopia, for instance the study conducted by Goshim(2011), on "performance of micro finance institutions in credit risk management, found that the failure to effectively manage credit risk contributed to a greater extent to the micro finance institutions crisis. Secondly, Abafita, (2003) regarding microfinance and loan repayment performance found that the overall repayment performance of the borrowers and the screening technique is sound and the credit scheme has contributed positively in terms of improving the incomes, access to education, access to health facilities and nutritional status of the borrowers. A current study is conducted by Pasha and Negese, (2014) on Performance of Loan Repayment Determinants in Ethiopian Micro finance found that age of respondents, education level, time lag between loan application and disbursement, complicated loan processing procedures, Repayment period, and Loan diversion was found as essential and significant determinant of loan repayment rate.

Although there are many studies investigate the role of credit risk management on performance of financial institutions across countries around the globe, there are limited studies investigating role of credit risk managements on MFIs in eastern Ethiopia during recent periods. Specifically, there is no any type of study conducted in case of Dire-Dawa, Somali and Hararmicro finance institutions. Secondly, review of empirical literature witnessed that scholars finding is reasonably inconsistent. On the other hand, current studies possible searching and access witnessed that there are no recent studies conducted during preceding 5 years on role of credit risk management on performance of micro finance institutions in Ethiopia.

Finally, previous study did not include major proxies of credit risk management such as credit scoring and risk diversification. Combination of all those deficiencies forced researcher to conduct this study.Efforts and methodologies employed will have capability to fill knowledge andvariable gaps encountered.

1.3Objectives of Study

1.3.1 General Objective

General objective of the study is to investigate the effect of credit *Risk* management on financial performancein selectedmicro finance institutionin Eastern Ethiopia.

1.3.2 Specific Objectives

Depend on the above general objective, the study developed the following specific objectives: -

1. To examine the effect of credit diversification on financial performance of selected micro finance institutions in Eastern Ethiopia.
2. To measure the effect of capital adequacy ratio on financial performance of selected micro finance institutions in Eastern Ethiopia.
3. To assess effect of credit risk on financial performance of selected micro finance institutions in Eastern Ethiopia.
4. To assess effect of credit scoring on financial performance of selected micro finance institutions in Eastern Ethiopia.
5. To examine effect of non-performing loan on financial performance of selected micro finance institutions in Eastern Ethiopia.

1.4Hypothesis of the Study

In line with the broad objective of study the following alternative hypothesis were formulated based on theoretical and empirical literature.

H_1: There is significant positive relationship between Diversification and the ROA.

H2: There is significant positive relationship between capital adequacy ratio and ROA.

H_3: There is significant negative relationship between Credit risk and ROA.

H_4: There is significant positive relationship between Credit scoring and ROA.

H_5: There is significant and negative relationship between Non-performing loan and ROA.

1.5Significance of the Study

The result of this study will benefit to following parties and stakeholders. The result of the study will benefit the management of MFIs. Based on the findings of the study the managements will be able to understand how performance of their MFI is influenced by the study variables and develop strategies to be taken in order to improve the performance of the respective MFIs. government is also interested in knowing which MFIs operate with optimum level of solvency to take the necessary measures to avoid insolvency and bankruptcy of micro-finance institutions. customers primarily borrowers and potential customers interested in knowing the ability of MFI to serve them in long-termcan also be beneficiary, since study has measured level of solvency and performance by several proxies.Finally, the findings of this study will be also useful as a springboard to academicians for their further study on the same area.

1.6Scope of the Study

The study hasbeen conducted on selected micro-finance institutions which are operated and providing service in Eastern Ethiopia specifically around Dire-Dawa town administration, Hararіregional state and Somali regional state. Even though there are several formal, semiformal and informal financial institutions in Ethiopia, the study has focusedon micro finance institution in Eastern Ethiopia.

This study has judgmentally reduced total population of study to four-micro finance institution (Dawa, Harar, Somali and Oromia). Criteria for sampling were possibility of access to information and capacity of investigator. Researchers sample sizehas capability to infer total population. The dependent variable was (ROA) proxy for performance and independent variables were; diversification, capital adequacy ratio, credit risk, credit scoring and non-performing loans ratio. Independent variablesspecified to measure credit risk management are adequate and appropriate in that theoretical as well as empirical literature supports them. Finally, researcher intends to draw conclusion only on regional level, even if significant studies can be conducted on national, continental or global level.

1.7Limitation of the Study

As stated in objective of study researcher aims to relate credit risk management with financial performance of microfinance institutions in Eastern Ethiopia only. However, there are several factors that may affect financial performance of insurance sector such as; company size, leverage, inflation or GDP etc.Secondly, as study employed quantitative approach, the qualitative aspects of effect of credit risk management on financial performance of microfinance institutions in Eastern Ethiopia over the studyperiod were not considered.

1.8Organization of the Study

This thesis is organized in to five chapters. Chapter one deals with introductory part of study specifically; background of the study, statement of the problem, hypothesis, objectives, significance of the study, scope of the study, and organization of the study. The Second chapter deals with review of related theoretical and empirical literature. Third chapter will focus on research design and methodology. In this chapter the road map for tasks to be done in following section has been clearly specified with reasonable justification. Fourth chapter will be all aboutresults and discussion. Last chapter is summary, conclusion and recommendation of study.

CHAPTER TWO
LITERATURE REVIEW

Introduction

Chapter two describes the major theories behind credit risk management, performance and empirical works conducted in this area. This chapter also discussed key theoretical and empirical considerations from previous studies. The chapter is concluded by summarizing the findings which leads to the construction of the research gap and conceptual framework.

2.1 Theoretical Review

2.1.1 Nature of credit and Credit Risk

A. Concept of Credit

The term Credit, in Latin means "he or she believes". This “believe” is the trust which permits one party to offer resources or money to another party whereby the second party does not instantaneously or right away reimburse the first party. This spawns a debt to the second party, but with an arrangement either to repay or return those resources or possessions of equal value or excess at a later on. Credit is a contractual agreement that permits a borrower to receive something of value and agrees to reimburse the lender at a later date, usually with an interest. As opined by (Tetteh, 2012) the resources granted may either be financial (for instance loans), or they could be goods or services. However, credit includes any form of postponed reimbursement given out by a creditor (called the lender) to a debtor (referred to as a borrower).

Lenders, such as banks, building societies, credit unions or finance companies, provide credit to borrowers who promise to pay at a stipulated date. Previous studies by Liberman (2016), Ouazad and Rancière (2016) and Koulafetis (2017) have reported that there are different forms of credit, including bank credit, consumer credit, international credit, public credit, investment credit, rent to buy and mortgages. Individuals and organizations have different motives for accessing credit. The rationale and the nature of credit have been classified into short-term, medium-term and long-term loans (Sedlak et al., 2016). The short-term loans are advances (e.g. personal loans) extended to the borrower with a payback period of not more than five (5) years. Medium-term loans (intended for Small and Medium Enterprises) have a repayment period that falling between

five and ten years. Long-term loans as the name points out, have a repayment period of more than ten years. In Ghana, majority of the borrowers access short and the medium-term loans (Tetteh, 2012). It has been demonstrated by (Seifert et al., 2013) that banks profit from advancing credit to customers. An emphasis by Silvestro and Lustrato (2014) stipulates that one of the main significant operations of the banks is allotting credit to clients, and also being a major asset of the organization. It has the ability of generating colossal profit but comes with equally high risk as well. Bhasin (2015) found that credit menaces are the highest registered when banks are linked with losses. The credit menace arises from a borrower who does not honor reimbursement as promised (Maroro et al. 2015).

Faure (2013) defines bank loans as advances and credit. This proportion of the bank's balance sheet makes up the vast majority of their assets. There are two categories of loans: Non-marketable debt (NMD) (made up of loans to non-banks and interbank loans) and Marketable debt (MD), i.e. investments. The author pursued that the majority of bank loans are NMD. On the other hand, Peter S. and Sylvia C. (2010), emphasize on the various loan types which include real estate loans, financial institution loans, agricultural loans, commercial loans, consumer loans, lease financing receivables and miscellaneous loans. Banks invest most of their funds in the creditfacilities, which can be divided into:

Direct Credit Facilities: This includes the payment of a sum of money to the customer with the right to demand repayment in the future with benefits and commissions. An example of it includes loans and advances,and the current debtor and Credit Cards. Therefore, it is possible to grantcredit facilities as short-term, medium-term, or long-term. Also, the customershould provide the guarantees as a condition to get him credit.

Indirect Credit Facilities: This refers to a pledge or security issuedby the Bank. Examples include: guarantees and letters of credit, which playsan important role in international trade and in import and export (Alrgebat, 2014).

B. Credit risk

The Global Association of Risk Professionals (GARP) defines credit risk (also referred to as default risk) as the potential for a loss due to failure of a borrower to meet its obligations to repay a debt in accordance with agreed terms. A home owner stops making mortgage payments is an

example of credit risk. According to the GARP, for banks, credit risk typically resides in the assets in its banking book (loans, and bonds held to maturity) and can arise in the banking book as counterparty credit risk. Faure (2013) defined credit risk as the risk that the borrower from a bank will default on the loan and/or the interest payable, i.e. that it will not perform in the conditions under which the loan was granted. According to the author, credit risk is damaging to the bank, not only because of the actual loss eventually incurred, but also in terms of the time that management and bank counsel expend on attempting to recover the loss or a portion of the loss. In the same line, two other authors, Peter S. Rose and Sylvia C. Hudgins (2010) defined credit risk by the following illustration. Financial intermediaries make loans and take on securities that are nothing more than promises to pay. When borrowing customers fail to make some or all of their promised payments, these defaulted loans and securities result in losses that can eventually erode capital. Donald et al, (1996) defines credit risk simply as the potential that a bank borrower or counterpart will fail to meet its obligations in accordance with agreed terms.

Credit risk occurs when the customer does not pay the premiums,interest, or part of it at the defined time in a credit agreement. However,there are ways to reduce credit risks, including:

Efficiency of Workers in the Banking Credit: The bank should interest workers in the banking credit and train themand especially with regard to financial analysis of the client and the use ofcomputers in the analysis process. In addition, it should also provide physicaland moral incentives to them, as well as the necessity of the presence ofdepartment to follow, and collection that have qualified workers. Also,thebank must have department responsible for the management of banking risk.

Diversification of bank credit granted by the length of time, and depending on the purpose and the banking sector to reduce credit risk.

Insurance of the guarantees and the lives of borrowers throughvarious insurance companies.Subsequently, the studying of the credit of customers is based on thefive elements of the resolution, a credit-based model 5Cs which are:

Character: Character means the client's reputation or client's desire to pay.Hence, it is possible to identify it through the study of the history of theclient as they interact with the bank. In addition, it also has to do with hisreputation in the market in which he operates.

Capacity: It is the client's ability to get a loan. The bank can study the legalform of the company and the financial analysis of the financial statements,and the cash flows for the client. Therefore, the aim of this analysis is toknow the customer's ability to repay the loan.

Capital: It is one of the elements of the credit decision, which relies on thestudy of the capital of the company size, sales, cash flows, and market share of the customer.

Collateral: The second source of repayment after the cash flows and the bankmust obtain guarantees from customers to reduce credit risks. Thus, there aremany kinds of collateral such as: cash insurance, personal sponsorship, land,cars, buildings, and securities.

Conditions: It is one of the elements of the credit decision, which relies on thestudy of the economic and political conditions. The bank, in the case of arecession, reduces the rate at which they grant credit. On the other hand, they make the process of giving grants rigorous such as raising interest rates; thus,in the case of inflation, the bank is expanding in the granting of creditfacilities (Musa et al., 2012).Consequently, each bank selects credit policy that does not conflictwith the central bank's instructions. Thus, it helps them to reduce the size ofthe credit risk that relates to the credit of the bank policy which includes thefollowing:

The Geographic Area: Here, the bank determines the geographicarea where the Bank operates and it depends on many factors which includes; the size of the resources available to the bank and the amount ofcompetition with other banks.

Determine the Types of Credit: The bank determines the types ofcredit that deal with the customers and it gives interest with thediversification of the credit.

Determine the Acceptable Collateral to the Bank: The guarantees consider the second defense of the credit after the cash flows.

The Maturity: The bank should determine the period of variouscredit.

The Ceiling of Credit: The bank should specify the upper ceilingsof extended credit to customers.(Al-Zubaidi, 2002).

2.1.2 Credit Risk Management

Credit risk management in financial institutions has become crucial for the survival and growth of these institutions. It is a structured approach of uncertainty management through risk assessment, development of strategies to manage it and mitigation of risk using managerial. The strategies of credit risk management involve transferring risk to other parties, avoiding risks, reducing the negative influence of risk and accepting some or all of the consequences of a particular risk (Afriyie&Akotey, 2012). According to Van Gestel and Baesens, (2008) credit risk is managed in various ways. The most important method starts with appropriate selection of the counterparts and products. And good risk assessment model and qualified credit officers are key requirements for selection strategy. For counterparts with higher default risk, banks may need more collateral to reduce risk. And the pricing of product should be in line with the estimated risk. Secondly, limitation rule of credit risk management restricts the exposure of bank to a given counterpart. It avoids the situation that one loss or limited number of losses endangers the banks.

Bank's determinants on how much credit a counterpart with a given risk profile can take need to be limited. Thirdly, the allocation process of banks provides a good diversification of the risks across different borrowers of different types, industry, and geographies. As a result, diversification strategy spreads the credit risk thus avoids a concentration on credit risk problems. Last but not least, banks can also buy credit protection in forms of guarantees through credit derivative products. By the protection, the credit quality of guaranteed assets has been enhanced. These techniques are translated in the daily organization by written procedures and policies which determine how counterparts are selected, risk profile loans are granted and above which level an expert evaluation is required (Gestel&Baesens, 2008, p.43).

2.1.3 Credit Risk Management Process

The process of management of credit risk in banking business tracks on the risk identification, measurement, assessment, monitoring and control. It involves identification of possible risk factors, evaluate their consequences, monitor activities exposed to the identified risk factors and institute control measures to prevent or reduce the unwanted effects. This process is applied within the strategic and operational framework of the bank. Risk management have five major processes. Credit risk mostly crops up when the client or counterparty fails to meet its

commitments in accordance with the agreed terms. The bank is expected to manage the credit risk inherent in the entire portfolio as well as the risk in individual credits or transactions. The primary goal of credit risk management is to increase a bank's risk-adjusted rate of return (Eckles et al., 2014) by managing credit risk exposure within acceptable structures.

The sound practices seek to strive for integrated actions to specifically manage risk. The practices include:

(i) identifying a potential credit risk;
(ii) measuring the intensity of the risk;
(iii) assigning an appropriate treatment to the credit risk detected; and
(iv) monitoring and ensuring suitable control over credit risk.

For these practices to be realized, principles for the management of credit risk cannot be circumvented. When a customer to whom a bank lends credit defaults on the payment; the bank is at a major risk, because its growth plans are based on the investments it makes out of the interest earned on this loan. However, regulatory requirements on loans should be more stringent, and banks are expected to become more circumspect in their lending activities. This will reduce indiscriminate and reckless lending, which could increase default rate. If a loan is to be allotted proper credit risk management process is required. Implementing a risk solution is very significant when a sound financial model runs through the entire business, as well adhering to real-time monitoring of credit scores (Weber et al, 2008).

2.1.4 Theories of Credit Risk Management

The available literature provides many theoretical considerations to justify the adoption of risk management in banks including financial economics theory, new institutional economics theory, agency theory, stakeholder theory and Portfolio theory.

2.1.4.1 The Financial Economic Theory:

Financial economics approach to corporate risk management builds on the ModiglianiMiller paradigm and has so far been the most prolific in terms of both theoretical model extensions and empirical research (Klimczak, 2007). This theory stipulates that hedging leads to lower volatility of cash flow and therefore lower volatility of firm value. The theory argues that the ultimate

result of hedging, if it indeed is beneficial to the firm, should be higher value – a hedging premium. Jin and Jorion (2006) criticize this theory by posting that ―although risk management does lead to lower variability of corporate value which is the main prerequisite for all other effects, there seems to be little proof of this being linked with benefits specified by the theory.

2.1.4.2 Portfolio Theory

Since the 1980s, banks have successfully applied modern portfolio theory (MPT) to market risk. Many banks are now using earnings at risk (EAR) and value at risk (VAR) models to manage their interest rate and market risk exposures. Unfortunately, however, even though credit risk remains the largest risk facing most banks, the practice of MPT to credit risk has lagged (Margrabe, 2007). Under the portfolio theory, traditionally banks have taken an asset-by-asset approach to credit risk management. While each bank‘s method varies, in general this approach involves periodically evaluating the credit quality of loans and other credit exposures, applying a credit risk rating, and aggregating the results of this analysis to identify a portfolio‘s expected losses (Gakure, Ngugi, Ndwiga and Waithaka, 2012). According to Gakure et al (2012) the foundation of the asset-byasset approach is a sound loan review and internal credit risk rating system. In this approach a loan review and credit risk rating system enable management to identify changes in individual credits, or portfolio trends in a timely manner (Gakure et al, 2012). Based on the results of its problem loan identification, loan review, and credit risk rating system management can make necessary modifications to portfolio strategies or increase the supervision of credits in a timely manner (ibid).

While the asset-by-asset approach is a critical component to managing credit risk, it does not provide a complete view of portfolio credit risk, where the term risk refers to the possibility that actual losses exceed expected losses. Therefore, to gain greater insight into credit risk, banks increasingly look to complement the asset-by-asset approach with a quantitative portfolio review using a credit model. Banks increasingly attempt to address the inability of the asset-by-asset approach to measure unexpected losses sufficiently by pursuing a portfolio approach. According to Essendi (2013) the portfolio has a basic assumption that investors often want to maximize returns from their investments for a given level of risk and provides a framework for specifying and measuring investment risk and to develop relationships between risk and expected returns. One weakness with the asset-by-asset approach is that it has difficulty identifying and measuring

concentration. Concentration risk refers to additional portfolio risk resulting from increased exposure to a borrower, or to a group of correlated borrowers.

The traditional portfolio approach uses two methods, namely the expert method and the credit scoring models in the expert system, the credit decision is left in the hands of the branch lending officer. His expertise, judgment, and weighting of certain factors are the most important determinants in the decision to grant loans. The traditional approach to the assessment of credit proposition of borrowers is based on the heuristics or intuition of the loan officer. Heuristic decision making is, however, not necessary arbitrary or irrational because it is based on years of experience that enable individuals to identify solution quickly without going through an analytical process (Rosli, 2000). The 5Cs of credit are always used by banks to assess the creditworthiness of the potential borrower. The 5Cs of credit refer to Character, Capacity, Conditions, Collateral and Capital (Dev, 2009). Character assessment is performed to determine the willingness and desire of borrowers to repay debt. Capacity is described as the borrower‘s capacity to borrower and also his repayment capacity. Economic conditions will also affect the borrower‘s ability to repay the loan. A bank will normally ask for collateral as security against the loan. Capital requirement of the business indicates the financial net worth of the borrower. The loan officer can examine as many points as possible but must include these five Cs in addition to interest rate.

In order to estimate default probability credit scoring models, use statistical and mathematical methods (Togtokh, 2012). Some writers note that the reason for this increased use of the scoring methods is that the methods are relatively cheap, bases on historical data and simple compared to modern approaches. For example, Mester (cited in Togtokh, 2012)revealed widespread useof credit scoring models showing that 97 percent of the banks use credit scoring to approve credit card application, whereas 70 percent of the banks use credit scoring in their small business lending.

2.1.4.3 Agency Theory

The agency theory explains a possible mismatch of interest between shareholders, management and debt holders due to asymmetries in earning distribution, which can result in the firm taking too much risk or not engaging in positive net value projects (Mayers and Smith, 1987). The Agency theory was first postulated by Jensen and Meckling in the 1976 article ―Theory of the

Firm: Managerial Behavior, Agency Costs and Ownership Structure‖ and it helped establish agency theory as the dominant theoretical framework of the corporate governance literature and position shareholders as the main stakeholder (Lan and Heracleous, 2010). Smith and Stulz (1985) posit that agency issues have been shown to influence managerial attitudes toward risk taking and hedging in the field of corporate risk management.Consequently, agency theory implies that defined hedging policies can have important influence on firm value (Fite and Pfleiderer, 1995).

2.1.4.4 New Institutional Economists Theory:

The new institutional economists shift their focus is to governance processes and socioeconomic institutions that guide these processes Williamson (1998). Klimczak (2007) notes that there are no empirical studies of new institutional economics approach to risk management that have been carried out so far but the theory offers an alternative explanation of corporate behavior Klimczak (2007) points out that the theory predicts that risk management practices may be determined by institutions or accepted practice within a market or industry. According to Williamson (1987) adds that the theory links security with specific assets purchase which implies that risk management can be important in contracts which bind two sides without allowing diversification, such as large financing contract or close cooperation within a supply chain.

2.1.4.5 Stakeholder Theory

The stakeholder theory was initially developed by Freeman in 1894 as a managerial instrument and as since evolved into a theory of the firm with high explanatory potential. According to Klimczak (2007) the stakeholder theory focuses explicitly on equilibrium of stakeholder interests as the main determinant of corporate policy and that it ‘s most promising contribution to risk management is the extension of implicit contracts theory from employment to other contracts. Omasete (2014) posits that the stakeholder theory helps to address the importance of customer trust and financial distress costs to companies. Finally, the theory suggests that smaller firms are more prone to financial problems, which should increase their interest in risk management practices.

2.1.5 Profitability as indicator of good performance

Profitability is the ability of business enterprise to make returns from all the business activities of an organization,Co, firm, or an enterprise. It analyzes management effectiveness in the use of organizational economic resources in adding value to the business and its stakeholders. Performance may be taken as a relative termmeasurable in terms of profit and its relationship with several elements that can directly influence theprofit. Performance is the relationship of return to some balance sheet measure which indicatesthe relative ability to earn income on assets employed to earn income (Ajao, S. & Solomon S., 2012).

2.1.5.1 Return on Assets

Net income gives an idea of how well a financial institution is doing, but it suffers from one major drawback: It does not adjust for the company's size, thereby making it difficult to compare how well one insurance is doing relative to another. A basic measure of financial institution performance (profitability) that corrects for the size of the insurance is the return on assets (ROA). It is calculated by dividing net income of the insurance by the value of its assets. That is, profit after tax / total assets. ROA is a useful measure of how well a company manager is doing on the job because it indicates how well an insurance's assets are being used to generate profits. Brealey, Myers and Marcus affirmed that manager often measure the performance of a firm by the ratio of net income to total assets, otherwise referred to as Return on Asset. Although ROA provides useful information about firm's profitability, it is not the most important to equity holders (Brealy. R.A. Myers S.C & Marcus A.J, 2014)

2.1.5.2 The concept of performance in micro finance institution

William, G. et al, (2013) argued that the performance of micro finance institution in financial terms is normally explained in net interest revenue recognized, profit from underwriting activities, yearly turnover, ROI, ROE. These measures could be splinted as underwriting performancemeasures and investment performance (which is a function of asset allocation and asset management as well as asset leverage) measures. Hafiz & Malik, (2011) is among others, who have suggested that although there are different ways to measure profitability, it is better to use ROA.

Walsh, (1996) states performance is revealed by putting relationship between balance sheet and income statement values. Income before interest and tax (IBIT) could be measured against total economic resources or capital employed or net worth. We could do likewise with profit before tax and profit after tax and gives us nine possible measures of performance. However, in most finance literatures profitability is measured by ROA (return on assets) which is defined as the profits after tax divided by total assets. Profit before interest and tax (PBIT) could be measured against total assets or capital employed or net worth. We could do likewise with profit before tax and profit after tax and gives us nine possible measures of performance through extortion, because of its monopoly power in the market.

Concept performance is the ability of a given investment to earn a return from its use of assets. The term Profitability however is not same with "Efficiency". Profitability is one a measure of efficiency; and is regarded as a measure of efficiency. Profitability or good performance is one of the most important purposes of financial management. One goal of financial management is to upgrade the total wealth of companies and performance which in turn shows better performance. Profit is simply absolute term, but profitability is a relative concept or meaning of profit. But, both are closely related and mutually used, having distinct roles in business. Profit means total income earned by the company during the specific period, while profitability refers to the operating and financing efficiency of companies. It is the ability of the firm to make profit on sales. Performance is the ability of business to get sufficient return on the capital and personnel used in the business operation ibid (Harward& Upton, 1961),

2.1.6 Theories of profitability

The term theory refers analytical tool for recognizing, describing, and making estimation regarding agiven subject matter. There are various theories with regard to financial performance of companies particularly insurance companies. Among them Clark theory of profitability and Schumpeter Theory of Profitability are cited as major ones.

2.1.6.1 Clark Theory of Profitability

Clark started his theory with an analysis of a nonprofit economy and taking into consideration its key characteristics. The performance less economy is in comparison with profit-making economies and significant change was specified to indicate the causes of income. This technique was adopted by Schumpeter and Knight. The profit-less economy is starting to as not dynamic change in which all factors are constant and not faced to change, the economy is assumed to be perfect; if there is no monopoly and entrepreneurship are rewarded according to manager wage levels. There is good mobility and inflow/outflow of all economic units in a frictionless environment; in short all impediments to competition are liquidated. "The society acts also lives, but does so in a changeless manner" (Siddiqi, 1971).

Any change in these factors will produce a tremor in the system but the economy will adjust and settle at new equilibriums. So changes in population and capital will result in corresponding fluctuations in wages and interest rates, the economy will absorb these changes and then settle back to a static state. Changes in methods of production affects outcome and prices levels; adoption of the same techniques by other producers will cause a shift in the equilibrium level, but once these become ubiquitous the equilibrium will resume. The ability of the economy to endure such changes is due to the competitive equilibrium dynamics of the free market. (Emmanuel, N.R, 1997).

Real economies as noted by Clark will, however, not buffer such changes instantaneously as there will necessarily be a time lag. Frictional delay that the entrepreneurs consume to enter and make their income before equilibrium returns and consumes his profit. Profit is hence a transitional phenomenon: untransformed increments of wages and interest its temporary nature demands from the entrepreneur a dynamic endeavor to seek out or generate opportunities on which he can capitalize. This process is summed up in Clark's statement that dynamic forces, then, account today for the existence of an income that static forces will begin to dispose of tomorrow. Profit accrues because the society is dynamic by nature. Dynamic nature of world makes future probable and any act, the result of which has to come in future, involves certain degree of risk. Profit is the value of risk taking and risk bearing power of investors. It arises only in a dynamic society which means in a society where changes does not occur that is, it is static by nature the risk element disappears and hence the profit element does not exist there. A people

is named to be dynamic when there is a change in its number of population, trends of the people, accumulation of the capital, supply of entrepreneurs among others. When all these not changes, the upcoming period also becomes certain and the risk element disappears from the people (As cited by Imran, 2015).

As cited by Imran, (2015) profit is the result of an adjustment, which is brought about by the entrepreneurs themselves. They may find new techniques of production by inventing new machines. Their consumption decreases the effort of production and reduces the course of time period as well and gives the entrepreneur higher returns. But when the application of machine and production becomes common and used by the other entrepreneur operating in the nation, the supply of goods ups and the prices declines. Hence the profit margin also goes down. Under this condition the return is determined by the force of demand and supply of enterprise at a point where they are similar. This theory is also known as windfall theory of profits. This considers return as a residue in price after deducting costs; hence it is a residual theory of profitability.

2.1.6.2 Schumpeter Theory of Profitability

Following on the method of Clark, Schumpeter developed the 'circular flow model' in which a profit-less economy is described where perfect competition extinguishes surpluses of monopoly and friction. The discussion of the circular flow of overall economy changes in detail from the static state model. So violation between an ideally competitive economic environment and actual economies yield the causes of profit. Schumpeter, however, is far more selective in his approach than Clark. Schumpeter has been selected the single notion of invention as paramount, so that changes based upon invention are the cause of profit. Gradual changes in number of population and peoples capital would easily be estimated by the market and hence present no opportunity for the entrepreneur. Schumpeter goes on to state 5 areas in which invention will lead to gross profit generation (Siddiqi, 1971).

Innovations in commodities, either by introducing new products or improving old ones;
(ii) Innovations in production techniques;(iii) Finding new and fertile markets;
(iv) Locating new resources and raw materials;(v) Changes in industrial organization.

The entrepreneur is for Schumpeter an innovator, who by virtue of his innovation is able to break from the competition, acquire a transitory monopoly in which he can accrue profits until his

competitors catch up, but, before they do so, he is able to move on to further innovation in new fields. Schumpeter did not see the entrepreneur's reward as a surplus value but rather as a functional reward linked to his innovative ability (Siddiqi, 1971). The effect of invention has big, leads to gales of creative destruction as innovations caused old stock, ideas, technologies, skills, and property to become unnecessary. Schumpeter has saw the model of perfect competition in which not similar firms sold similar items at similar prices levels produced through similar methods as immaterial to process.

2.2 Empirical Review

Performance of a micro finance institution is either positively or negatively affected by different measures of credit risk management. The following are the empirical findings investigated by different researchers' role of credit risk management on performance global level, continental level ad national level.

2.2.1 Empirical Studies Abroad

Kisala (2014) examined the relationship that exists between credit risk management on the loan performance of MFIs in Kenya. The researcher used a descriptive research design that involving an exhaustively analysis of credit risk management and its relationship with loan performance in micro finance institutions. A sample size of nine MFIs was used, however, both primary data and secondary data was collected from 5 microfinance institutions through questionnaires and annual reports (2007-2011). The researcher used ROE as a profitability indicator while CAR and NPL ratio as credit risk management pointers. The findings of the study pointed out that there is a major correlation involving credit risk management and loan performance. The findings of the research indicated that NPL and CAR do have a negative and comparatively significant effect on ROE. NPL ratio had a greater effect on ROE as compared to CAR. The study instituted that there is a correlation between credit risk management and microfinance institutions financial performance.

Kodithuwakku (2015) performed a study on the impact of credit risk management on performance of commercial banks in Sri Lanka. The study used ROA as performance indicator while it used LLP/NPL, NPL/TL, LLP/TA and LLP/NPL ratio. The result shows that non-performing loans and provisions have an adverse impact on the profitability.

Kaaya and Pastory (2013) researched on credit risk and commercial banks in Tanzania, using panel data analysis. The study used ROA and ROE as performance indicators and LLP/TL, LLP/NPL, LLP/NPL and NPL/TL ratios as credit risk indicators. The study concluded that the increase in credit risk tends to lower firm performance; both indicators produced negative coefficients which tend to lower profit level. From a few samples of studies reviewed above it is evident that best and widely used indicators of banks performance are ROE and ROA and the most used indicators of credit risk performance are NPL/TL, CAR, TL/TD and LLP/NPL ratios.

Accoridng to Odongo (2013) past studies have found out that the announcement of regulatory change is viewed by market participants as generally unfavorable. The objective of this study was to investigate the impact of stock price reaction to changes in capital adequacy regulation in the Kenyan banking sector. In his Study on CAR and bank performance in Kenya (Odongo,2013) found out that capital adequacy announcement leads to underperformance of stocks in the market as they had negative cumulative abnormal return values especially in the post announcement dates.

Magnifique (2013) evaluated the link of credit risk management in regards to financial performance of profit-making banks in Rwanda. His research had four key goals in ascertaining the identification, analysis, and assessment of credit exposure, credit-scoring method, and risk supervision and their effect on commercial banks financial performance in Rwanda. A descriptive research design was used in carrying out this research with a sample size of eleven commercial banks. Using a questionnaire, primary data was collected for analysis. The findings of the study indicated that three key objectives played a major function in predicting the banks financial performance except for risk monitoring. Credit risk identification explained the productivity of these banks in Rwanda while scoring, analysis as well as assessment of credit risk explained the financial performance. However, this study took into account the correlation of credit risk management in regards to the monetary performance of banks only, whose capital adequacy requirements are different from that of Microfinance institutions. Secondly, the study was carried out in Rwanda whereas the objective of this research is to evaluate the impact of credit risk management in MFIs on financial performance within Ethiopian context.

Hosna et al. (2009) researched on the credit risk management and Profitability in Commercial Banks in Sweden where they studied four major commercial banks. Their study used ROE as the

performance indicator and CAR and NPL/TL as credit risk variables. They employed the regression analyses model. Their study showed that NPL/TL ratio has a significant negative effect on profitability (ROE) while CAR had an insignificant positive effect on ROE.

In the study done by Djan, Frimpong, Bawuah, Halidu and Kuutol (2015) covering default rate, cost per loan assets and capital adequacy ratio, it was found that all these parameters have an inverse impact on banks 'performance; however, the default rate is the most predictor of bank financial performance.

Boahene, Dasah and Agyei (2012) used regression analysis to determine whether there is asignificant relationship between credit risk and profitability of Ghanaian banks. They followed theline of Hosna, Manzura and Juanjuan (2009) by using Return of Equity as a measure of bank's performance and a ratio of non-performing loans to total asset as proxy for credit risk management. They found empirically that there is an effect of credit risk management on profitability level of Ghanaian banks. The study also suggests that higher capital requirement contributes positively to bank's profitability.

Murage (2014) carried out a study on the relationship of credit risk on the corporate liquidity of DTMs in Kenya. The researcher using secondary data obtained from CBK and AMFI in Kenya using a sample size of 5 DTMs for a period of 2011-2013. Using correlation analysis, regression analysis, descriptive analysis and variance analysis the key findings pointed out that credit risk and debt to equity ratio had a positive correlation with corporate liquidity for DTMs.

Additionally, portfolio to asset ratio, operating expense ratio and Portfolio at Risk had a negative correlation with corporate liquidity. Lastly, the study shows that weakening in the quality of the credit portfolio, very high operational expenses and Portfolio at Risk may have a long-term effect on the earnings or capital of a firm and thus adversely affecting the liquidity position.

Achou and Tenguh (2008) shows that there is a significant relationship between bank performance (in terms of return on asset) and credit risk management (in terms of loan performance). Better credit risk management results in better bank performance. Thus, it is of crucial importance that banks practice prudent credit risk management and safeguarding the assets of the banks and protect the investors' interests. Korir (2014) assessed the outcome of credit risk management on the fiscal performance of DTMs that are licensed by the Central

Bank. The researcher used a descriptive research design in his study that drawn in an exhaustively analysis of credit risk management and financial performance as the major variables. A sample size of nine Microfinances was used, however, both primary data and secondary data was collected from 6 microfinance institutions through questionnaires and annual reports (2011 - 2014). Return on asset (ROA) model was used as a profitability indicator while Default rate, cost per loan asset, and bad debt cost as credit risk management indicators. Using multiple regression analysis, the key finding of the study was that cost per loan asset, and bad debt cost and default rate are major credit risk management indicators that have an inverse effect on financial performance of DTMs. This study however, focused exclusively on DTMs leaving out the non-deposit taking MFIs.

2.2.2 Empirical Studies in Ethiopia

Belayneh (2011) specified that Gross Domestic Product is the only significant factors from macroeconomic indicators. He stated that Gross Domestic Product of the country makes commercial banks to be more profitable. A high growth rate may strengthen the debt servicing capacity of domestic borrowers, and therefore contribute to less credit risk. The study also examined a negative and strongly significant impact of credit risk on Ethiopian commercial banks.

Girma M, (2011) has conducted study on credit risk management and its impact on performance on Ethiopian commercial banks. He has employed quantitative research design,under the quantitative research design survey method is used. The data were collected by cross sectional survey method. Analysis of primary data by descriptive statistical tools and on hypothesis testing using regression model.He concludes that banks with good credit risk management policies have a lower loan de fault rate and relatively higher return on asset.

Elias W. (2015), has conducted study on how credit risk management affects the profitability in the seven-sample selected commercial banks using a balanced panel data from 2009-2013 and 35 observations in Ethiopia. Study used quantitative approach and focuses on the description of the outputs from SPSS, used regression model to do the empirical analysis. In the model the researcher defined ROE as profitability indicator while Loan loss provision, liquidity, operating inefficiency, loan growth and capital adequacy ratio as credit risk management indicators. The regression results revealed that loan loss provision, operating inefficiency & loan growth have

positive and statistically significant impact on banks profitability (Return on Equity). Finally, the results indicate that liquidity & capital adequacy have a negative but statistically significant relationship with banks Return on Equity.

The impact of credit risk management on performance of private commercial banks in Ethiopia was examined by Shibiru&Mebratu (2017) for period 2000 to 3013. Fixed Effect model was adopted. Secondary data was gathered from audited financial statement of 6 selected private banks. The result suggested that Credit Risk Management (capital adequacy, Non-Performing Loans, Bank size and Liquidity) have significant impact on financial performance of private banks.

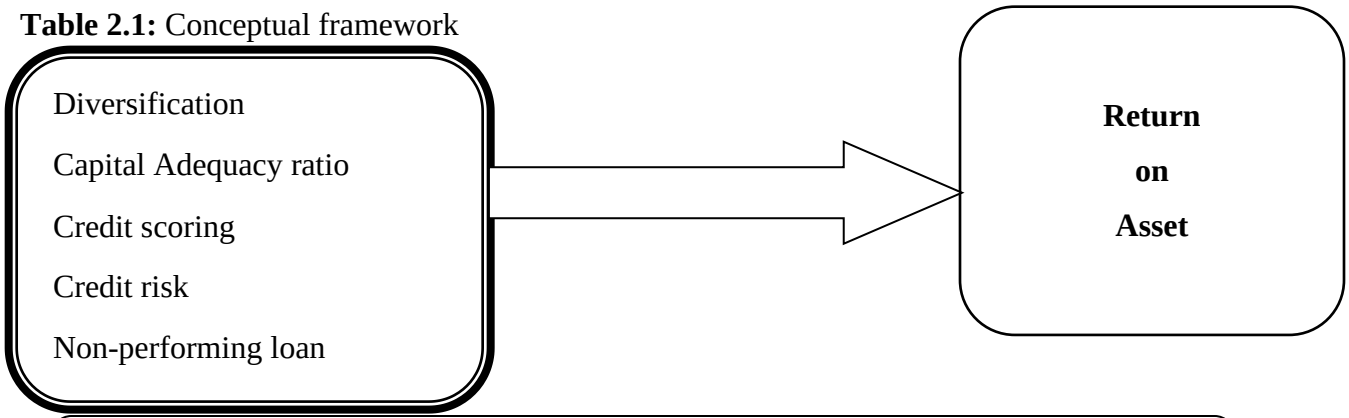
2.3 Summary of Literature and Research Gaps

Many empirical works have been conducted in Ethiopia and abroad regarding role of credit risk management on performance of financial institutions. Review of literatures showed that studies on the role of credit risk management on performance revealed serious inconsistencies.Some empirical studies include; (Alshatti 2015), Hosna, et al (2009), Aruwa and Musa (2012), Boahene, et al (2012), Musyoki&Kadubo (2012), Kaaya&Pastory (2013), G/egziabher (2013), Girma M (2011), Elias (2015), Shibiru&Mebratu (2017) and Pash a&Negese, (2014). On the other side, none of studies in Ethiopia have investigated micro finance institutions in east Ethiopia in their sample. Thirdly, basic variables such as diversification of risk, capital adequacy, and credit scoring have not been including in their combination of variables.

2.4 Conceptual Frameworks

Diagram below depicts the relationship between credit risk management and performance of financial institution.

Table 2.1: Conceptual framework



Source: Adopted from Keynes (1936), (Pandey, 2015), Lazaridiset.al., (2006), &Garcia.T et.al, (2007), Chip, (2021) and Thomas, (2021).

CHAPTER 3
METHODOLOGY OF THE STUDY
Introduction

This chapter focused on research approach and research design to be used, the population and sampling techniques adopted with justification of applying each and every method. Secondly, sources of data and data collection instruments, method of data analysis were discussed accordingly. Finally, model specification as well as measurement of dependent and independent variables was another focus of a chapter.

3.1 Research Design and Approach

Most of research methods and approaches in this study were based on suitability of methods for achieving the basic objective of the study. In the investigative study there are three common approaches to business and social research, namely quantitative, qualitative and mixed methods approach (Creswell, 2003).Quantitative research approach was suitable to achieve a research objective stated earlier. The dependent variable, return on asset can be measured in quantitative terms and the explanatory variables such as; diversification, capital adequacy ratio, credit scoring, credit risk and non-performing loans ratio are quantitative terms. Hence, the quantitativeresearch approach was employed in this study.

Research design provides the framework for the collection and analysis of data or it is the plan and structure of investigation so conceived as to obtain answers to research questions (Cooper & Emory, 1995). Many research designs could be used to study business problems. Depending on the way in which researchers ask their research questions and present their purpose, the research design could be classified into three groups, namely exploratory, descriptive and explanatory studies (Hair et al., 2011). Explanatory study is performed when the researcher has little information or when the research problem is badly understood (Hair et al., 2011). It is particularly useful to clarify the understanding of a problem, such as if you are unsure of the precise nature of the problem. Explanatory research design was used in this study. Cause and effect relationship with adequate interpretation has been well done with explanatory design.

3.2 Population and Sampling

3.2.1 Population

Target population is the collection of elements or objects that possess the information sought by the researcher and about which inferences are to be made. The target population contains members of a group that a researcher is interested in studying (Singh, 2006).

The target population of this study was30 micro finance institutionin Ethiopia as of June 2021. Inthose micro finance institutions, there are thousands of branches and ten thousands of employees. The study has included previous fifteen years 2006/2007-2020/21 informationto gather the required data.

3.2.2 Sample Size and Sampling Technique

If the cross-sectional units used in the sample are homogeneous, using non-probabilistic purposive sampling technique is efficient than any other technique (Singh, 2006). In this study researcher has investigatedfour micro finance institutions operating in Dire-Dawa town administration and Somali regional state purposively. Basic inclusion criteria for sampled institution are their operation in Dire-Dawa town administration. Four micro finance institutions such as; Dire, Harar, Somali and Oromia micro finance institutions were selected as sample purposively.

All other micro finance institutions that do not operate around Dire-Dawa town were excluded from sample. All data was collected on annual base and the data or figures for the variables were as of June 30 of each year under study. Accordingly, available reports of sampled micro finance institution 2006/07-2020/21 of the15 yearswas included in the sample frame except Somali micro finance institution established in 2011 GC. Eleven years data was gathered.

3.3 Sources and methods of Data Collection

After evaluating all possible data collection, the researcher found that the most appropriate method that provides practical answers to the research questions and the stated objectives of the study is the use of secondary data. Hence, the data to be used for this study is purelysecondary in a nature which has been obtained from annual report of the sampled micro finance institutionsfor

period covering 2006/07-2020/21. Both dependent and independent variables were deduced from the annual report of selected micro finance institutions sampled.

3.4 Methods of Data Analysis

The collected panel data has been analyzed using correlations and regression analysis with the help of (STATA). Correlation matrix was used to examine the relationship between the dependent variables and explanatory variables.Pearson's correlation regression model wasused to determine the relative importance of each independent variable that performance of micro finance institutions.

Indeed, regression analysis was applied to identify the level of significance and strength of relationship between dependent variable and the independent variables. In line with this regression analysis wasused to conclude and test the casual relationship between the credit risk management and performance of micro finance institutions.

3.5 Model Specification

The study has emphasized on the effect of credit risk management on financial performance of selected micro finance institutions. The researcher has usedthe panel regression to estimate parameters of regression model.

In this study hausmen test has been conducted to choose either fixed or random effect model is appropriate for the panel regression model.

Hypothesis for panel regression model

H0: Random effect is appropriate

H1: Fixed effect is appropriate

Panel regression model is specified as follows:

$$ROAit = \beta Xit, + \alpha i + uit\ i \text{----------} 1$$

Where:

β- Parametersof independent variable;

i - Micro finance institutions

t - Time period (2006/07-2020/21)

$\boldsymbol{\alpha}$ – Un-observableindividual specific effects

$\boldsymbol{uit}$ –Residual

The effect of independent variables such as; diversification, capital adequacy ratio, non-performing loans ratio, credit risk and credit scoringon ROA is estimated and model is specified in linear equation as:

ROAit= β0 + β1 **(CD)** it + β2 **(CAR)**it+β3**(CS)**it– β4**(CR)** it–β5**(NPLR)** it+**Uit+$\boldsymbol{\alpha i}$** ----1

Where:

ROA:----------The dependent variable which is Return on Asset.

$\boldsymbol{\beta 0}$: ----------The intercept of coefficients

CD:----------Diversification

CAR:----------Capital Adequacy Ratio

CS:----------Credit scoring

CR:----------Credit Risk

NPLR:----------Non-Performing Loans Ratio

$\boldsymbol{\beta 1}$ ... **$\boldsymbol{B5}$**: -------The slope of coefficient

$\boldsymbol{Uit}$: ----------Disturbance term

3.6 Diagnostic Test

To ensure the data is in conformity with the assumptions of CLRM test for normality, Hetroscedasticity and multi-collinearity has been conducted.

Normality of residuals. To check for skewness of the distribution of the data normality test was conducted.

H0: Error term is normally distributed

H1: Error term is not normally distributed

Heteroscedasticity: To test for the presence of Heteroscedasticity, the popular brush-pagan test has been employed in this study. If Heteroscedasticity problem is detected researcher intends to take appropriate remedial measure to solve heteroscedasticity problem.

H0: There is no heteroscedasticity problem in the model.

H1: There is heteroscedasticity problem in the model.

Multicollinearity:

Researcher has conducted test for Multicollinearity to check whether there is a strong correlation among the independent variables or not. If the Multicollinearity problem occurs, the regression model is unable to tell which independent variables are influencing the dependent variable. If Multicollinearity problem is detected researcher, intends to take appropriate remedial measure to solve problem. To check for Multicollinearity problem researcher has applied variance inflation factor which is appropriate for continuous data set and research that encompasses quantitative data type.

Ho: No exact linear relationship exists between any of the explanatory variables
H1: There is exact linear relationship exists between any of the explanatory variables.

Autocorrelation:

For detecting the Serial independence, the investigator has used the Breusch-Pagan LM Test of independence. If the error term for any observation is related to the error term of other observation, it indicates that autocorrelation problem exists in the model. In the case of autocorrelation problem, the estimated parameters can still remain unbiased and consistent, but it is inefficient According to Brooks (2008). If there is autocorrelation problem the result would be irrelevant. Due to the invalid hypothesis testing, it may lead to misleading results on the significance of parameters in the model. To test for the existence of autocorrelation, the popular Breusch-Pagan LM test of independence has been conducted in this study.
H0: There is no autocorrelation problem in the model.
H1: There is autocorrelation problem in the model.

3.7 Description and Measurement of variables

3.7.1 Dependent variable

Return on asset (ROA):

Return on assets is a measure of how successful a business is relative to its total assets employed. ROA informs a manager, investor, or economic analyst an idea as to how effective a firm's management is at using its assets to generate earnings. Return on assets is displayed as a percentage. ROA is regarded as the best and widely used indicator of performance or

profitability. ROA assesses how efficiently company is managing its revenues and expenses (Pandey, 2015).

3.7.2 Independent variables

Diversification

Diversification is the first principle of risk management as applied in portfolio theory. Banks donot lend a major proportion of their funds to individualborrowers. Rather, they restrict the amount loaned to apercentage of their capital. They are also diversifiedacross economic sectors and countries. In mostcountries, the bank regulator or supervisor stipulates astrict constraint in terms of loan concentration(IMF 2019).

Capital Adequacy Ratio

Capital adequacy is the level of capital that banks are required to hold to enable them to withstand credit, market and operational risks they are exposed to. It is used to absorb the potential losses resulted from their day to day activities and protect the bank's debtors. Bank capitalization was measured by the ratio of capital and reserves to total assets (Pandey, 2015)

Non-Performing Loans Ratio

A non – performing loan is any obligation or loan in which interest and the principal payments are more than 90 days, more than 90 days of worth of interest has been refinanced, capitalized or delayed by agreement or if payments are less than 90 days overdue but payments are no longer anticipated (IMF 2009).

Credit risk

Is possibility of a loss resulting from a borrower’s failure to repay a loan or meet contractual obligations.

Credit Scoring

Credit scoring is a statistical analysis performed by lenders and financial institutions to determine the creditworthiness of a person or a small, owner-operated business. Credit scoring is used by lenders to help decide whether to extend or deny credit.

Table 3.2: Measurements of variables notation and expected signs

Variables	Measurement	Notation	Expected relations	Theoretical & empirical literature
Dependent var.				
Return on asset	Net income/Total asset	ROA		Keynes (1936)
Predictor var.				
Diversification	Weighted average of volatilities / by the portfolio volatility	CD	+	(Pandey, 2015)
CapitalAdequacy Ratio	Capital and Reserves/ Risk weighted Asset	CAR	+	(Pandey, 2015)
Non-Performing Loans Ratio	Nonperforming loans portfolio / Total amount of outstanding loans the MFI holds.	NPLR	-	Lazaridis et.al., (2006), &Garcia.T et.al, (2007)
Credit Risk	Percentage of probability of default.	CR	+	Chip, (2021)
Credit Scoring	580-669 fair, 670-739good, 740-799 very good 800 and above excellent (average credit score)	CS	+	Thomas, (2021)

Source: Adopted from Keynes (1936), (Pandey, 2015), Lazaridiset.al., (2006), &Garcia.T et.al, (2007), Chip, (2021) and Thomas, (2021).

CHAPTER 4
RESULTS AND DISCUSSION

Introduction

This chapter presents a discussion of the results subsequent to collection of secondary data annual report of each branch. First part of this chapter consists two major section of analysisincluding a correlation analysis, and panelregression analysis. To achievethis STATA v13 has been used accordingly.

4.1 CLRM Assumptions and Diagnostic Tests

4.1.1 Normality

Brooks (2008), states that, if the residuals are normally distributed, the histogram should be bell-shaped and the Shapiro-Wilk W teststatistic would not be significant at 5% significant level. The table depicted below shows test statistic is insignificant. This shows residuals are normally distributed. Due to this reason null hypothesis of Error term is normally distributed is accepted and alternative hypothesis of Error term is not normally distributed is rejected.

Table4.1: Normality of residuals

Shapiro-Wilk W test for normal data					
Variable	Obs	W	V	Z	Prob>z
ROA	56	0.97936	1.122	0.248	0.40193
CD	56	0.97686	1.258	0.495	0.31042
CAR	56	0.97286	1.476	0.839	0.20087
NPLR	56	0.92554	1.048	3.014	0.129
CR	56	0.95532	1.429	1.913	0.2790
CS	56	0.91002	1.891	3.422	0.31

Source: Output of Stata-13 (2022)

4.1.2 Heteroskedasticity

As shown in table 4.2below, the chi-square value was small (0.05) and probability of chi square was also greater than 5% significance level(82.10%)for Breusch-Pagan / Cook-Weisberg test for

heteroskedasticity. Results of test indicateheteroskedasticity was probably not a problem or at least that if it was a problem; it was not a multiplicative function of the predicted values. The alternative hypothesis stated earlier as the error variances increase/decrease as the predicted values of Y increase, the bigger the predicted value of Y, the bigger the error variance is, has been rejected and null hypothesis of no heteroscedasticity problem in the model has been accepted. Finally, residuals are homoscedastic in this multiple linear regression model.

Table 4.2: Test for general heteroskedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of ROA
chi2(1) = 0.05
Prob> chi2 = 0.8210

Source: Output of Stata-13 (2022)

4.1.3 Multicollinearity Among Explanatory Variables

Results of statistical software in table 4.3 below shows that mean value of a VIF for all independent variable equals 1.35. This value indicates that there is no strong correlation between independent variable on average. According to (Brooks, 2008) VIFs between 1 and 5 suggest that there is a moderate correlation, but it is not severe enough to warrant corrective measures.

Accordingly, researcher has accepted null hypothesis of there is no exact linear relationship exists between any of the explanatory variables and rejected alternative hypothesis of there is exact linear relationship exists between any of the explanatory variables. Finally, there is no strong collinearity among explanatory variables in the model.

Table 4.3: Test for Multicollinearity

Variable	VIF	1/VIF
CAR	1.53	0.653088
CS	1.46	0.683211
CD	1.36	0.736152
CR	1.33	0.750469

NPLR	1.07	0.936581
Mean VIF	1.35	

Source: Output of Stata-13, (2022)

4.1.4 Autocorrelation

In order to test for independence of residuals Breusch-Pagan LM test of independence was conducted based on panel units in fixed effects model. Results of test in table 4.4 below shows chi2 = 20.650, and Pr = 0.13529 implying no cross sectional dependence of residuals in panel data set. Output of software in table 4.4 below shows that probability of chi square 13.53% was greater than the significance level of 5%. This is indication of no serial correlation problem exists in the model.

Table 4.4: Test for Autocorrelation

Breusch-Pagan LM test of independence:
chi2= 20.650,
Pr = 0.13529

Source: Output of Stata-13 (2022)

4.2 Correlation Analysis

Table 4.5 below shows Pearson's correlation coefficientthat measures the statistical relationship, or association, between two continuous variables. It is named as the best way of measuring the association between variables of interest because it is based on the method of covariance. It gives information regarding the magnitude of the relationship, or correlation, as well as the direction of the association Gujarati, (2004).

According to Yilma (2009), if Correlation coefficient between variables is –1/1 this is indication of a perfect (negative/positive) linear relationship among variables, correlation coefficient from

0.70-0.90 have very strong association, from 0.50-0.69 have Substantial association, from 0.30-0.49 have Moderate association, from 0.10- 0.29 have Low association, and from 0.01-0.09 have negligible association. As shown in table 4.5 below, there is no perfect correlation and zero linear correlation among any of outcome as well as explanatory variables.

In this model credit scoring and capital adequacy ratio has negative substantial correlation between them. On the other hand, return on asset and capital adequacy ratio, nonperforming loans ratio, and credit scoring has moderate association. Secondly, credit diversification and capital adequacy ratio, and credit scoring has moderate association. Finally, capital adequacy ratio and credit risk; credit risk and credit scoring has also moderate association. In addition to this, return on asset and credit diversification; credit diversification and non-performing loans ratio has low association among them. Correlation between remaining dependent and independent variable is negligible.

Table 4.5: Pearson's correlation of variables

	ROA	CD	CAR	NPLR	CR	CS
ROA	1.0000					
CD	0.2560	1.0000				
CAR	0.4296	0.1789	1.0000			
NPLR	-0.4290	0.0071	-0.1502	1.0000		
CR	-0.0079	-0.3847	0.2206	-0.0823	1.0000	
CS	-0.6989	-0.1853	-0.5338	0.2445	-0.2224	1.0000

Source: Output of Stata (2022)

4.3 Regression Analysis

4.3.1 Model Specification

As shown in table 4.6 above probability of chi square is 0.0000. This implies alternative hypothesis formulated as of fixed effect is appropriate could be accepted and null hypothesis could be rejected. It is possible to apply fixed effect model. That means there are various unobservable individual specific effects which are time invariant and account for any

individual-specific effects not included in the model as explanatory variable. Indeed, fixed effects model is appropriate.

Table 4.6: Fixed vs. random effect model specification/ Hausman test

---- Coefficients ----				
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Re	Fe	Difference	S.E.
CD	0.0039167	-0.0001612	0.004078	.
CAR	0.0200079	0.0634688	-0.0434609	.
NPLR	-0.1401586	-0.0994148	-0.0407437	0.0215485
CR	-0.0850064	0.0570021	-0.1420085	.
CS	-0.0911131	-0.0863196	-0.0047935	0.0076027
chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 25.88 Prob>chi2 = 0.0001 (V_b-V_B is not positive definite				

Source: Output of Stata-13 (2022)

4.3.2 Results of Regression Analysis

4.3.2.1 Test for Overall Significance of econometric Model

In this section of analysis empirical findings obtained from the panel regression output regarding role of credit risk management on performance in selected micro finance institutionsis interpreted. The first table 4.7 below shows results for overall model fitness. As shown in regression output R^2measure the proportion of the variance for a dependent variable that's explained by an independent variable in a regression model and Prob>F statistics refers significance of overall model.

Panel regression R-squared of the model was 0.6896. R-squared value indicates the 49.23 variability of performance of selected micro finance institutionswas explained by the explanatory variables included in the regression model. Hence explanatory variables included in the model were indicators of credit risk management; results imply that 49.23% of variation in performance was explained by credit risk management of micro finance institutions.On the other hand,

remaining 50.77%percentage of variation in performance of selected micro finance institutionin Ethiopia was explained by factors not included in the panel regression model. The explanation power of model is substantially enough to affect dependent variable.

In the table 4.7 below the p-value of 0.0000 lower than 1% attached to the test statistic reflects that the null hypothesis formulated as all of the coefficients are jointly zero should be rejected. Thus, it implies that the independent variables in the model were able to explain variations in the dependent variable. This can be interpreted as; at least one variable included in the multiple regressionmodels was significant predictor of dependent variable return on asset (ROA).

4.3.2.2 Hypothesis test for individual significance of variables

Table 4.7 below shows panel regression results of relationship between the dependent variable (ROA) and independent variables such as; diversification, capital adequacy ratio, non-performing loans ratio, credit risk and credit scoring. Coefficients indicate influence of explanatory variables on dependent variable, standard error implies a measure of the statistical accuracy of an estimate, and p-value implies significance level of each explanatory variables.

In table 4.7coefficient of constant term or $\beta 0$ is 0.1219516. Implying when value of all predictor variables has zero value return on asset will be 12.19%. 12.19 implies from one birr investment in asset micro finance institutions are earning 12.19 cents. As shown above constant term was found to be significant. This means that the mean effect of all omitted variables may be important, that does mean that constant shouldn't be taken out because it does two other things in an equation.

As shown on regression results in table 4.7 below measures of credit risk management such as; capital adequacy ratio, non-performing loans ratio, and credit scoring had found statistically significant factor to determine performance of micro finance institutions during study period. On the other hand, among the five explanatory variables, two measure of credit risk management named as diversification and credit riskhas found to be statistically insignificant predictor of performance.

Table 4.7: Panel regression analysis

Fixed-effects (within) regression	Number of obs = 56
Group variable: code	Number of groups = 4
R-sq: within = 0.6896	Obs per group: min = 15
between = 0.0002	avg = 15.0
overall = 0.4923	max = 15
	F(5,51) = 22.66
corr(u_i, Xb) = -0.3094	Prob> F = 0.0000

ROA	Coef.	Std. Err.	T	P>|t|	[95% Conf. Interval]	
CD	-0.0001612	0.0057615	-0.03	0.978	-0.0117279	0.0114055
CAR	0.0634688	0.0290332	2.19	0.033	0.0051823	0.1217553
NPLR	-0.0994148	0.0386695	-2.57	0.013	-0.1770472	-0.0217825
CR	0.0570021	0.0542349	1.05	0.298	-0.0518791	0.1658833
CS	-0.0863196	0.0140626	-6.14	0.000	-0.1145515	-0.0580877
CONS	0.1219516	0.0272023	4.48	0.000	0.0673407	0.1765625

sigma_u0.02846597
sigma_e0.02733452
rho 0.52026843 (fraction of variance due to u_i)

Source: Output of Stata-13, (2022)

- **Substituted equation:**

ROA it = 0.1219516 + 0.0634688**(CAR)** it -0.0863196**(CS)** it–0.0994148(**NPLR)** it+ εit

I. Capital Adequacy Ratio and Performance of micro-finance institutions.

The results show that the coefficient ratio of the capital and reserve to the total assets was positive and statistically significant at 5 % level of significance. This implies that one percentage change in Capital adequacy ratio, results in a 6.346% change in ROA of micro finance

institutionin Ethiopia, which means that higher capital adequacy ratio will lead to higher return from asset of micro finance institutions.

Result of this study is reliable with the hypothesis of the study and results of previous empirical literature. Results of study by Berrospide& Edge (2010), Thomas F., Cosimano, & Dalia S., Hakura (2007) and William Francis & Matthew Osborne (2009) also points out that the increased capital adequacy ratio will cause higher return on asset. The result of findings in consistence with findings of Berhanu, Bouvatier&Lepetit, (2016). Due to this reason researcher had accepted alternative hypothesis of coefficient of CAR is different from zero and rejected null hypothesis of no relationship between CAR and performance of micro finance institutions during study period. The basic argument of these researchers for the positive relationship between micro-finance capitalization and performance is that micro finance institution with larger capital cushion against credit risks should have prospers.

II. Non-performing loans ratio andPerformance of micro-finance institutions.

The result on the regression shows that non-performing loan ratio negative and statistically significant effect on the performance of MFIs in the study period. The parameter value shows that 1 percent increase in non-performing loans decreases return on asset by 9.94 percent. Inversely, one percent decrease in non-performing loans ratio result in 9.94 percent increase in in return on asset or performance of micro finance institutions in Ethiopia.

The results verify hypothesis that better credit risk management results in better micro finance institution performance. The researcher aware that return on asset (performance) is anendogenous variable which means that it can influence the magnitude of non-performing loans. Since better profitability affords the financial institution to write off more bad loans.Thus, this empirical study found a negative significant relationship between non-performing loans ratio and performance of micro finance institution.The result was in line by the priorfindings of Achou&Tenguh (2008), Hosna et al. (2009),Mekasha (2011), Tefera (2011), Kargi (2012) and Shibiru&Mebratu (2017). Theyconcluded that NPL ratio has negative and significant impact on performance of micro finance institutions.

III. Credit scoring andPerformance of micro-finance institutions.

As depicted in table 4.7 above coefficient for explanatory variable credit scoring is -0.0863.This means that the coefficients in panel regression are one-unit increase in credit scoring results in a 0.0863-unit decrease the financial performance of micro finance institutions in Ethiopia. Due to this reason researcher hadaccepted alternative hypothesis of significant relationship between credit risk andperformance of micro finance institutions. In contrary null hypothesis of nosignificant relationship between two is rejected. It is possible to conclude that there is significantnegative relationship between credit scoring and micro finance institutions.

According to Pandey, (2015) as there is higher cost of credit scoring firms' performance could also be decreases. Generally, result of this paper is consistent with research hypothesis and theoretical background.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATION

Introduction

In this chapter researcher has recommended to management and employees, and policy makers by identifying which independent variables were significant and better influence the performance of Dire, Harar, Somali and Oromiamicro finance institutions. This chapter was organized in to four major sections. First section was summary part and the second was conclusion of results based on the findings, the third was recommendations and the fourth was the future chance to conduct further research by other investigators on this research title.

5.1 Summary

General objective of the study was to examine role of credit risk management on performance of selected micro finance institutions specifically operating in eastern Ethiopia. Related specific objective of this study was to examine relationship between individual measures of credit risk management and measures of performance (ROA). To achieve general and specific objective of study researcher had analyzed relationship between credit risk management and performance of four micro finance institutions during period covering 2006/7-2020/21. Indirectly this study has panel nature. In this study quantitative approach along with explanatory research design was employed.

Correlation analysis and panel regression analysis was used to predict role of credit risk management measures on performance of micro finance institutions.This study used to measure performance of micro finance institutions by using ROA similar to most of the aforementioned researchers. ROA has measured by ratio of net income after tax to total asset. In other words, return on asset was dependent variable and proxies of credit risk management such as; diversification, capital adequacy ratio, non-performing loans ratio, credit risk and credit scoring were explanatory variables.

5.2 Conclusion

The fixed effects regression output showed that capital adequacy ratio is positively related to performance of micro finance institutions and statistically significant. Secondly, it is showed that non-performing loans ratio was negatively related to performance of micro finance institutions and statistically significant. In addition to this credit scoring of institutions has significant and negative relationship with performance of micro finance institutions.

5.3 Recommendation

Based on finding of study this study has extended several recommendation and suggestions to Dire, Somali, Harar and Oromiamicro finance institution managers and policy makers of micro-finance institution as stated in significance of study.

Result of study indicated that non-performing loans ratio have first higher factor that affect performance of micro finance institutions. The higher non-performing loan results in higher loss in performance of selected micro finance institutions. Thus, managers ofmicro finance institution could able reduce non-performing loans by using; group lending, standing notifications, continuous monitoring and legal procedures. Then they can enhance then growth of micro finance institutions and financial institution at national level.

Secondly, credit scoring is second major factor that determine performance of micro finance institutions. To attain better performance in selected micro finance institution could focus in activities that guard the credit of institution. Before extending they could able carefully assess creditworthiness of their customer and monitor their debtor up to full repayment of their debt.

Indeed, policy maker for micro finance institution could able to specify proper criteria for lending so as to reduce default and delinquency of credit. The success of micro finance institution leads to growth of nation and every one’s daily life. In general, financial institutions policy makers could think issue of credit riskbeyond satisfying firms profit need; rather it may lead micro finance institutions operation to bankruptcies like numerous firms,ranging from Bear Stearns as well as bank of Lehman Brothers in 2008 to Kodak.

5.4 Suggestions for future research

This research paper will not be free from limitations and researcher had recommended further researcher to address those aspects not considered in this study. Even if credit risk management of selected micro finance institution determines larger percentage of its performance it does not mean there is no other factor that determine performance of micro finance institutions in Ethiopia. Future researchers could inclusively investigate macroeconomic, industrial and firms' specific factors that affect performance.

In the methodology section of this paper researcher had designed panel regression model and applied fixed effects regression model to predict parameters. To this end future researchers could take in to account advanced and new model for panel data set such as GLS and FGLS models. Indeed, future researches should add one issue in to empirical study. That is causality relationship between credit risk management and performance of micro-finance institution. There is some dilemma in researches mind. Is credit risk management cause performance to fall or rise? Or performance determines optimum credit risk management?

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Appendix 1

Raw data used in the panel study

YEAR	MFI	PANEL	ROA	CD	CAR	NPLR	CR	CS
2007	DMF	1	0.0503	1.9293	0.6532	0.101	0.2896	0.5861
2008	DMF	1	0.0712	2.1875	0.6687	0.194	0.325	0.6348
2009	DMF	1	0.0511	2.3498	0.6552	0.248	0.1057	0.7437
2010	DMF	1	0.1366	2.6977	0.9865	0.126	0.114	0.4415
2011	DMF	1	0.1652	2.2173	0.9988	0.085	0.123	0.3874
2012	DMF	1	0.1894	2.827	0.9999	0.076	0.1632	0.2456
2013	DMF	1	0.1955	3.3161	1.0012	0.103	0.18652	0.1326
2014	DMF	1	0.1988	2.7727	1.0321	0.023	0.235	0.1353
2015	DMF	1	0.2001	2.2512	1.0356	0.165	0.252	0.1012
2016	DMF	1	0.1999	2.2794	0.9652	0.146	0.2635	0.1553
2017	DMF	1	0.2312	0.8276	1.0777	0.101	0.2896	0.1
2018	DMF	1	0.0478	0.9203	0.5826	0.194	0.325	0.8651
2019	DMF	1	0.0579	1.2438	0.6713	0.1058	0.1057	0.6325
2020	DMF	1	0.053	1.3623	0.6413	0.1582	0.114	0.6986
2021	DMF	1	0.0532	1.47	0.6427	0.253	0.123	0.6395
2007	HMF	2	0.0111	1.3482	0.2413	0.364	0.1632	0.9689
2008	HMF	2	0.0804	2.1395	0.5326	0.028	0.18652	0.7695
2009	HMF	2	0.072	1.8366	0.5168	0.181	0.235	0.8625
2010	HMF	2	0.083	1.3253	0.6029	0.341	0.252	0.6598
2011	HMF	2	0.0855	0.9538	0.6119	0.135	0.2635	0.6963
2012	HMF	2	0.0965	2.6718	0.7056	0.081	0.2896	0.5222
2013	HMF	2	0.0999	3.0775	0.8013	0.077	0.325	0.4021
2014	HMF	2	0.0518	3.2945	0.7878	0.1058	0.1057	0.7895
2015	HMF	2	0.0904	3.0307	0.8762	0.1582	0.114	0.5641
2016	HMF	2	0.0795	1.8118	0.8922	0.253	0.123	0.6325
2017	HMF	2	0.0793	1.8323	0.4841	0.364	0.1632	0.6344
2018	HMF	2	0.1485	1.7887	0.6005	0.028	0.18652	0.2131
2019	HMF	2	0.1022	1.8603	0.7986	0.181	0.235	0.3212
2020	HMF	2	0.1161	1.9571	0.3256	0.341	0.252	0.3001

2021	HMF	2	0.1235	1.6785	0.8304	0.135	0.2635	0.2598
2007	OMF	3	0.1252	2.1589	0.5665	0.081	0.2896	0.2456
2008	OMF	3	0.1352	2.1406	0.5737	0.077	0.325	0.2312
2009	OMF	3	0.1452	1.9961	0.7145	0.1058	0.1057	0.1658
2010	OMF	3	0.0463	2.1272	0.4856	0.1582	0.114	0.9326
2011	OMF	3	0.0475	2.3654	0.7349	0.253	0.123	0.9256
2012	OMF	3	0.029	3.6928	0.7006	0.364	0.1632	0.9881
2013	OMF	3	0.1743	3.0177	0.6856	0.028	0.18652	0.1231
2014	OMF	3	0.0613	2.2457	0.6556	0.181	0.235	0.7365
2015	OMF	3	0.0695	2.7908	0.5655	0.341	0.252	0.7265
2016	OMF	3	0.1202	2.1036	0.5266	0.135	0.2635	0.2365

2017	OMF	3	0.1231	2.3909	0.5656	0.081	0.2896	0.2001
2018	OMF	3	0.1323	2.9691	0.6773	0.077	0.325	0.1996
2019	OMF	3	0.1322	4.0438	0.7276	0.1058	0.09	0.1999
2020	OMF	3	0.135	3.7648	0.8965	0.1582	0.132	0.1112
2021	OMF	3	0.134	4.2048	0.6568	0.253	0.06	0.1255
2007	SMF	4	0.1011	4.6322	0.8965	0.364	0.05	0.3255
2008	SMF	4	0.1591	4.3138	0.6325	0.028	0.05	0.1101
2009	SMF	4	0.182	3.5574	0.8788	0.181	0.08	0.1001
2010	SMF	4	0.1647	3.3439	0.5031	0.341	0.088	0.1021
2015	SMF	4	0.1351	2.7977	0.4894	0.1582	0.132	0.9908
2016	SMF	4	0.1255	3.017	0.3955	0.253	0.06	0.9998
2017	SMF	4	0.1217	2.8517	0.3999	0.076	0.05	1.002
2018	SMF	4	0.1379	3.6408	0.4001	0.103	0.05	0.7898
2019	SMF	4	0.098	2.7433	0.2999	0.023	0.08	1.2101
2020	SMF	4	0.102	2.3231	0.3312	0.165	0.088	0.9689
2021	SMF	4	0.1096	2.0163	0.3478	0.146	0.04	0.8695