St. Mary's University, Ethiopia

SCHOOL OF GRADUATE STUDIES

THE EFFECT OF CREDIT RISK MANAGEMENT ON PROFITABILITY OF SELECTED
COMMERCIAL BANKS IN ETHIOPIA

By

MESERET MENGISTU

ADVISOR: ASMAMAW GETIE (ASS.PROF.)

A THESIS SUBMITTED TO ST, MARY'S UNIVERSITY, SCHOOL OF GRADUATE
STUDIES, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTERS OF BUSINESS ADMINISTRATION

MAY, 2018

ADDIS ABABA, ETHIOPIA

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Acronyms and Abbreviations'

AIB	Awash International Bank
BCBS	Basel Committee on Banking Supervision
BIS	Bank for International Settlement
BOA	Bank of Abyssinia
CAR	Capital Adequacy Ratio
CBB	Construction and Business Bank
CBE	Commercial Bank of Ethiopia
CDOs	Collateralized Debt Obligations
CDSs	Credit default swaps
CRM	Credit Risk Management
CR	Credit Risk
DB	Dashen Bank
EL	Expected Loss
GDP	Gross Domestic Product
KYC	Know Your Customer
LTD	Loan to Deposit
LTDR	Loan to deposit ratio
NBE	National Bank of Ethiopia
NIB	Nib International Bank
NPLR	Non Performing Loan Ratio
OLS	Ordinary Least Square
RM	Relationship Manager
ROA	Return on Asset
ROE	Return on Equity
SSA	Sub – Saharan Africa
TL	Total Loan
UB	United Bank
UL	Unexpected Loss
WB	Wegagen Bank

Acknowledgements

Above all, I thank and pray the almighty of God for his love and helping me to complete my study peacefully.

My first gratitude goes to my advisor Asmamaw Getie for his valuable assistance, professional and technical advice and constructive criticisms all in my work.

I would also like to express my deepest gratitude to my family members who highly contributed by encouraging, appreciating and supporting me until the end of this study.

I am very much grateful to my previous boss Mr Kriyakos Armenakies who assisted me during the study. I am also indebted to all who share their views with me throughout the session.

Last but not least, I would like to express my thanks to Sent Mary University for giving me the opportunity to learn the Master's Degree in Business Administration.

Abstract

This paper examines the relationship of credit risk management and the profitability of commercial banks in Ethiopia. In general it argues that credit risk management has relation (effect) on profitability of commercial banks of Ethiopia. To examine its relationship or effect level the researcher uses panel data regression models by taking ROA (dependent variable) and NPLR (independent variable) and others as control variables Capital Adequacy ratio (CAR), Loan to Deposit ratio (LTDR) and Bank size. The researcher took seven banks exclusively that have 17 year and above life span in Ethiopia, those are Awash international bank, Bank of Abyssinia, Commercial bank of Ethiopia, Dashen bank, Nib international bank, Wegagen Bank and United Bank. The random effect estimation technique is applied and the regression result indicates that credit risk management has negative and significant effect on commercial banks profitability. Based on the finding it is recommended that all commercial banks in Ethiopia manage their loans effectively and efficiently through risk identification and mitigation before granting loans to their profit.

Key words: Banks Profitability, Credit Risk Management

DECLARATION

I, the undersigned declare that this thesis is my original work. Prepared under the guidance of ASMAMAW GETIE (ASS. PROF.). All sources of material used for the thesis have been duly acknowledged .

I further confirm that the thesis has not been submitted either in parts or in full to any other higher learning institution for the purpose of earning any degree.

MESERET MENGISTU

Name   _____

                                                                Signature

St. Mary's University,Addis Ababa

Chapter One

Introduction

1.1 Background of the study

The proper management of credit risk in financial institutions is critical for the survival and growth of financial institutions. Credit risk management is a structured approach to managing uncertainties through risk assessment, development of strategies to manage it and mitigation of risk using managerial resources (Harrison & Joseph, 2013).

Banking sectors play a key role in the development process through providing financial service for any operational economic activities. Stability of banking sector is highly important for the development economy. The primary function of bank is mobilizing deposits from surplus units to deficit units in the form of loan and advances. However, in recent years, banks have become very sensitive in extending loans due to non-performing assets (Sontake & Tiwari, 2013)

Different studies have been conducted in the area of this issue. For example, (Kolapo, Ayeni, & Oke, 2012) showed that credit risk management is positively related to profitability of banks in Nigeria. Kithinji (2010) Was examining the effect of credit risk management on the profitability of commercial banks in Kenya and he found that banks' profitability is not affected by credit risk management. When it comes to both credit and liquidity risk, Ruziqa (2013) has tested the impact of credit risk and liquidity risk on the financial performance of conventional banks in Indonesia. The results suggest that credit risk was negatively related to profitability while liquidity risk demonstrated a positive effect. These kinds of researches show that no exact final conclusion could be drawn until now and thus make this area worth studying. While providing credit as a main source of revenue, banking industry take in to account credit and portfolio management to minimize default risk. This is due the fact that while banks providing credit they are exposed to risk of default (risk of interest and principal repayment) which needs to be managed effectively to acquire the required level of outstanding loan and advance (Charles, 1999). According to the same author, it is believed that credit risk is known to have the adverse impact on profitability and growth of financial institution particularly for commercial banking industry. Hence, the success of most commercial banks depends on the achievements in credit risk management mitigating risk to the acceptable level.

Thus, the main objectives of this study is investigate the relationship between credit risk management and profitability of seven selected commercial banks in Ethiopia through employing random effect estimation techniques.

1.2 Statement of the Problem

The major source of revenue for banks is interest earned from credit through mobilizing deposits from surplus unit to deficit unit in terms of loans and advance. Therefore managing the credit risk is a very crucial issue for the profitability of commercial banks. The banks mostly concentrate on how to maximize their profit by giving loan to their customer rather than giving similar attention to credit risk which makes this area worthy to be study.

Risk management essentially involves identification of risks that surface during the course of the bank's business and dealing with them in an effective manner to minimize or eliminate the losses that may occur. The impacts of risk on bank through a number of risk factors, and the impact are ultimately reflected through capital loss, revenue loss, and decline in asset values. Risk management does not aim for avoidance and elimination of risks. It aims for minimization of the impact of risks and optimization of risk-adjusted return on assets. Dam Dan Luy.(2010).

Credit risk is defined as the potential that a bank borrower or counter party will fail to meet its obligations in accordance with the agreed terms. Credit risk, also called default risk, arises from the uncertainty involved in repayment of the bank's dues by the counterparty on time. Credit risk has two dimensions: the possibility of default by the counterparty on the bank's credit exposure and the amount of loss   that the bank may suffer when the default occurs. The default usually occurs because of inadequacy of income or failure of business. But often it may be willful, because the counterparty is unwilling to meet its obligations though it has adequate income. Credit risk also signifies a decline in the values of credit assets before default that arises from deterioration in portfolio or individual credit quality (BCBS, 2001).

Furthermore, Credit risk denotes that the volatility of losses on credit exposures in two dimensions: the loss in the value of the credit asset and the loss in the earnings from credit. Those loses mentioned in above had a direct and indirect negative relationship on the profitability of banks (Amalendu, 2012)

Different literatures and empirical evidence on the relationship between credit risk management and profitability of commercial banks shows different findings. The main finding of literatures can be categorized in to three: some of them concluded that credit risk management and profitability had a negative relationship. For instance, (Gizaw, Kebede, & Sujata, 2015; Mekash, 2011; Tefera, 2012) conducts in the area of credit risk management and profitability and they found that there is a negative relationship between credit risk and profitability. On the other hand other scholars had found positive relationship between two variables, such as (Boahene, Dasah, & Agyei, 2012) in their study of six Ghanian commercial banks covering a range of 2005 up to 2009. Panel data analysis were employed and they used non-performing loan ratio, net charge of rate and a pre-provision profit as a percentage of net total loans and advances as credit risk indicators. The author concludes that the Ghanian commercial banks generate high profit when there is high credit risk management system. In contrast to the above finding, other literatures show as a neutral effects and it makes complicated in the area of study. By employing a regression analysis and data collected from financial reports of commercial banks, Kithinji (2010), concluded that profitability of commercial banks measured by ROA did not show a significant relationship with credit risk management. This is a debatable intension in the area of study.

Moreover, a few researches had been conducted in the case of Ethiopian commercial banking industry, but there data analysis techniques, number of observation and linking empirical and theoretical evidence were the fundamental gaps/limitation studies in our country in general. Thus, to fill the above mention gaps, the main motives of this study is to examine the interrelationships of credit risk management and profitability on seven selected commercial banks covering the period of 2000 up to 2016 through measuring return on asset(ROA) as an indicators of profitability and NPL rates as credit risk management. Since the primary function of the bank mobilizing deposits from surplus unit to deficit unit in terms of loans and advance managing the risk associated with these credits is a very crucial issue to be study.

1.3 Research Questions

- ❖ What are the effects of credit risk management on profitability of banks?
- ❖ Is there a statistically significant relationship between nonperforming loan ratio (NPLR) and profitability of Ethiopian commercial banks measured by Return on asset (ROA)?

1.4 Objective of the Study

The general objectives of the study is "*to assess the relationship between credit risk management of Ethiopian commercial banks and their profitability*" from the time 2000 to 2016. In line with main objective of the study; the specific objectives this study was:

    I.   To assess the relationship between nonperforming loan, Capital Adequacy, Liquidity and Bank size with profitability of commercial banks;

   II.   To conduct an assessments empirical evidences on credit risk management and profitability on commercial banks.

1.5 Significance of the study

The ambiguity interrelationship between profitability and credit risk management has been the main issues in the current global business climate. The final outcomes of this study could be an input for banking leaders, policy makers and business owners, in general, to undertake the remedial actions in business investments management particularly for banking industry. The study will provide more information about credit risk management and profitability to extend further relevant research through employing different data analysis techniques.

1.6 Scope and Limitation of the Study

The scope of this study is mainly focused to assess the relationship between credit risk management and profitability of seven selected commercial banks in Ethiopia by using panel data (covering time range from 2000 to 2016). The study doesn't concern about detail experimental analysis in all commercial banks in Ethiopia in general.

During the study unavailability of some important data was the major limitation, however the researcher able to overcome the problem through unreserved effort in getting the data.

1.7 Organization of the Paper

This paper is composed of five chapters. Chapter Two reviews the theoretical and empirical studies about Credit Risk Management and profitability in Ethiopian banking business. Chapter three includes methodology of the study. Chapter four also provides the interpretation and analysis of data and finally, chapter five as usual gives conclusion and recommendation with policy implication and further research direction.

Chapter Two

Literature Related Review

2.1 Theoretical Framework

2.1.1 Risk Management

Risk management essentially involves identification of risks that surface during the course of the bank's business and dealing with them in an effective manner to minimize or eliminate the losses that may occur. It is a process that involves development of tools and techniques to identify and assess risks and establish systems and procedures to manage them. It includes formulation of policies and strategies and establishment of monetary limits and benchmark standards for different types of activities. Risk management is a series of business decisions based on appropriate business policies and strategies that seek to optimize risk-adjusted returns on assets. The aim is not to avoid risks, but to handle them and minimize their impact through the exercise of appropriate options like accepting and managing risks, hedging, or transferring them. Though development of tools and techniques and application of limits and controls are the core activities of the process, management attitude and employee ethics are important for realizing the full benefits of risk management. The bank management must establish high standards for managing risks and determine the limits and boundaries of acceptable risk levels, and the employees should acquire knowledge about the risks and participate in handling and controlling the risks. Consequently, management must devote enough resources to develop the internal risk management capability (John, 2012).

According to the same researcher, risk management strategies have two approaches. One approach is to identify risks one by one and handle each one separately. This is sometimes referred to as risk decomposition. The other is to reduce risks by being well diversified. This is sometimes referred to as risk aggregation. Both approaches are typically used by financial institutions. Consider, for example, the market risks incurred by the trading room of a U.S. bank. These risks depend on the future movements in a multitude of market variables (exchange rates, interest rates, stock prices, and so on). To implement the risk decomposition approach, the trading room is organized so that a trader is responsible for trades related to just one market variable (or perhaps a small group of market variables). For example, there could be one trader

who is responsible for all trades involving the dollar-yen exchange rates. At the end of each day, the trader is required to ensure that certain risk measures are kept within limits specified by the bank. If the end of the day is approached and it looks as though one or more of the risk measures will be outside the specified limits, the trader must either get special permission to maintain the position or execute new hedging trades so that the limits are adhered to.Dam Dan Luy.(2010).

Credit risks are also traditionally managed using risk aggregation. It is important for financial institutions to be well diversified. If, for example, a bank lends 40% of its available funds to a single borrower, it is not well diversified and likely to be subject to unacceptable risks. If the borrower runs into financial difficulties and is unable to make interest and principal payments, the bank could become insolvent. If the bank adopts a more diversified strategy of lending 0.01% of its available funds to each of 10,000 different borrowers, it is in a much safer position. Suppose that in an average year the probability of any one borrower defaulting is 1%. We can expect that close to 100 borrowers will default in the year and the losses on these borrowers will be more than offset by the profits earned on the 99% of loans that perform well. To maximize the benefits of diversification, borrowers should be in different geographical regions and different industries. A large international bank with different types of borrowers all over the world is likely to be much better diversified than a small bank in Texas that lends entirely to oil companies. But, however well diversified a bank is, it is still exposed to systematic risk, which creates variations in the probability of default for all borrowers from year to year. The 1% probability of default for borrowers in our example is for an average year. When the economy is doing well, the probability of default is less than this and when there is an economic downturn it is liable to be considerably more than this. Dam Dan Luy.(2010).

Since the late 1990s, we have seen the emergence of an active market for credit derivatives. Credit derivatives allow banks to handle credit risks one by one (risk decomposition) rather than relying solely on risk diversification. They also allow banks to buy protection against the overall level of defaults in the economy. However, for every buyer of credit protection there must be a seller. Many sellers of credit protection, whether on individual names or on portfolios, took huge losses during the credit crisis that started in 2007.

2.1.2 Risk in Banking

Risk in banking refers to the potential loss that may occur to a bank due to the happening of some events. Risk arises because of the uncertainty associated with events that have the potential to cause loss; an event may or may not occur, but if it occurs it causes loss. Risk is primarily embedded in financial transactions, though it can occur due to other operational events. It is measured in terms of the likely change in the value of an asset or the price of a security/commodity with regard to its current value or price. When we deal with risks in banking, we are primarily concerned with the possibilities of loss or decline in asset values from events like economic slowdowns, unfavorable fiscal and trade policy changes, adverse movement in interest rates or exchange rates, or falling equity prices. Banking risk has two dimensions: the uncertainty—whether an adverse event will happen or not—and the intensity of the impact—what will be the likely loss if the event happens (that is, if the risk materializes). Risk is essentially a group characteristic; it is not to be perceived as an individual or an isolated event. When a series of transactions are executed, a few of them may cause loss to the bank, though all of them carry the risk element (Amalendu, 2012).

Commercial banks are in the risk business. In the process of providing financial services, they assume various kinds of financial risks. Over the last decade our understanding of the place of commercial banks within the financial sector has improved substantially. Over this time, much has been written on the role of commercial banks in the financial sector, both in the academic literature and in the financial press. These arguments will be neither reviewed nor enumerated here. Suffice it to say that market participants seek the services of these financial institutions because of their ability to provide market knowledge, transaction efficiency and funding capability. In performing these roles they generally act as a principal in the transaction. As such, they use their own balance sheet to facilitate the transaction and to absorb the risks associated with it (Sandstorm, 2009).

There are activities performed by banking firms which do not have direct balance sheet implications. These services include agency and advisory activities. These items are absent from the traditional financial statement because the latter rely on generally accepted accounting procedures rather than a true economic balance sheet. Nonetheless, the overwhelming majority of the risks facing the banking firm are in on-balance-sheet businesses. It is in this area that the

discussion of risk management and the necessary procedures for risk management and control has centered. (Sandstorm, 2009).

2.1.3 Credit Risk

BCBS (2001), has defined credit risk as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with the agreed terms. Credit risk, also called default risk, arises from the uncertainty involved in repayment of the bank's dues by the counterparty on time. Credit risk has two dimensions: the possibility of default by the counterparty on the bank's credit exposure and the amount of loss that the bank may suffer when the default occurs. The default usually occurs because of inadequacy of income or failure of business. But often it may be willful, because the counterparty is unwilling to meet its obligations though it has adequate income. Credit risk also signifies a decline in the values of credit assets before default that arises from deterioration in portfolio or individual credit quality.

Credit risk is defined as the probability that some of a bank's assets, especially its loans, will decline in value and possibly become worthless. Because banks hold little owners 'capital relative to the aggregate value of their assets, only a small percentage of total loans need to go bad to push a bank to the brink of failure. Thus, management of credit risk is very important and central to the health of a bank and indeed the entire financial system. As banks make loans, they need to make provisions for loan losses in their books. (Raghavan, 2003)

The higher this provision becomes, relative to the size of total loans, the riskier a bank becomes. An increase in the value of the provision for loan losses relative to total loans is an indication that the bank's assets are becoming more difficult to collect (Tsorhe, Aboagye, & Kyereboah, 2015).

Credit risk is a risk of a loss resulting from the debtor's failure to meet its obligations to the Bank in full when due under the terms agree. (Raghavan, 2003)

According to National Bank of Ethiopian risk management Guideline; Credit risk has the highest weight among risks taken by the Bank in the course of its banking activities. Credit risk management in the Bank is carried out using putting in place limits for operations to limit credit risk; putting in place indicative limits for credit risk concentration and the share of unsecured loan portfolio; creation of security for credit operations; setting value conditions for operations

with respect to payment for risks taken; permanent monitoring of risks taken and preparation of management reporting for the Credit Committee, the Bank's management and units concerned; evaluation of regulatory and economic capital necessary to cover the risks taken in respect of the Bank's operations and ensuring its sufficiency; carrying out hedging operations; Permanent internal control over the Bank's units in respect of observing regulations on operations procedure and risk assessment and management procedures by independent units. BCBS (2001)

2.1.4 Credit Risk Management

According to Amalendu (2012); Credit risk management essentially deals with the risk from exposures before they reach the stage of default, and it is therefore not management of problem loans or loans that remain unpaid on the due dates. The broad objective is to ensure the quality of credit exposure, minimize the chances of default, and keep the prospects of recovery unimpaired till the relationship with the borrower is terminated. When the borrowers commit defaults in repaying their dues to the bank and the loans become bad, credit risk has materialized and the losses on the credit exposures are going to arise sooner or later. The essence of credit risk management is to set up procedures that assist in selecting good exposures and maintaining credit quality. The procedures should automatically throw up signals when the quality of individual credit or the portfolio begins to deteriorate, so that remedial measures can be initiated in time to prevent default, and if default occurs, to minimize the losses.

Credit risk management is a part of the entire credit management process. The latter is much broader in concept, and the former is a tool that helps in controlling the loss on credit. If there is laxity in credit management, it increases the incidence of defaults and the quantum of credit risk. Credit management encompasses all aspects relating to the selection of borrowers, provision for margin money and collateral support, proper utilization of funds, observance of financial discipline, and adherence to the repayment schedule by the borrowers. It includes supervision of the borrowers' activities and accounts by the bank. On the other hand, credit risk management seeks to minimize the incidence of risk materialization and the intensity of credit loss through establishment of standards for credit selection, diversification of credit portfolio, avoidance of credit concentration, prescription of prudent limits on exposure size, development of models for risk quantification, and prescription of strategies for risk mitigation. Credit risk management

focuses on reducing the probability of default. Credit risk management tools are sophisticated and complicated (Moral, 2011).

As to Laurent Clerc (2004) Participants analyzed the different risk management techniques by taking a look at the following two aspects: the emergence of a risk culture and the prevention of risk by building up regulatory capital in proportion to the level of risk exposure of each credit institution.

2.2 Credit Assessment

A thorough credit and risk assessment should be conducted prior to the granting of loans, and at least annually thereafter for all facilities. The results of this assessment should be presented in a Credit Application that originates from the relationship manager/account officer (RM), and is approved by Credit Risk Management (CRM). The RM should be the owner of the customer relationship, and must be held responsible to ensure the accuracy of the entire credit application submitted for approval. RMs must be familiar with the bank's Lending Guidelines and should conduct due diligence on new borrowers, principals, and guarantors (Amaledu, 2012).

According to NBE's credit directive 2008; Credit Applications should summaries the results of the RMs risk assessment and include, as a minimum; Amount and type of loan(s) proposed, Purpose of loans, Loan Structure (Tenor, Covenants, Repayment Schedule, Interest), Security Arrangements. In addition, the following risk areas should be addressed:

Borrower Analysis: The majority shareholders, management team and group or affiliate companies should be assessed. Any issues regarding lack of management depth, complicated ownership structures or inter group transactions should be addressed, and risks mitigated.

Industry Analysis: The key risk factors of the borrower's industry should be assessed. Any issues regarding the borrower's position in the industry, overall industry concerns or competitive forces should be addressed and the strengths and weaknesses of the borrower relative to its competition should be identified.

Supplier/Buyer Analysis: Any customer or supplier concentration should be addressed, as these could have a significant impact on the future viability of the borrower.

Historical Financial Analysis: An analysis of a minimum of 3 years historical financial statements of the borrower should be presented. Where reliance is placed on a corporate guarantor, guarantor financial statements should also be analyzed. The analysis should address

the quality and sustainability of earnings, cash flow and the strength of the borrower's balance sheet. Specifically, cash flow, leverage and profitability must be analyzed.

Projected Financial Performance: Where term facilities (tenor > 1 year) are being proposed, a projection of the borrower's future financial performance should be provided, indicating an analysis of the sufficiency of cash flow to service debt repayments. Loans should not be granted if projected cash flow is insufficient to repay debts.

Account Conduct: For existing borrowers, the historic performance in meeting repayment obligations (trade payments, cheques, interest and principal payments, etc) should be assessed.

Adherence to Lending Guidelines: Credit Applications should clearly state whether or not the proposed application is in compliance with the bank's Lending Guidelines. The Bank's Head of Credit or Managing Director/CEO should approve Credit Applications that do not adhere to the bank's Lending Guidelines.

Mitigating Factors: Mitigating factors for risks identified in the credit assessment should be identified. Possible risks include, but are not limited to: margin sustainability and/or volatility, high debt load (leverage/gearing), overstocking or debtor issues; rapid growth, acquisition or expansion; new business line/product expansion; management changes or succession issues; customer or supplier concentrations; and lack of transparency or industry issues.

Loan Structure: The amounts and tenors of financing proposed should be justified based on the projected repayment ability and loan purpose. Excessive tenor or amount relative to business needs increases the risk of fund diversion and may adversely impact the borrower's repayment ability.

Security: A current valuation of collateral should be obtained and the quality and priority of security being proposed should be assessed. Loans should not be granted based solely on security. Adequacy and the extent of the insurance coverage should be assessed.

Name Lending: Credit proposals should not be unduly influenced by an over reliance on the sponsoring principal's reputation, reported independent means, or their perceived willingness to inject funds into various business enterprises in case of need. These situations should be discouraged and treated with great caution. Rather, credit proposals and the granting of loans should be based on sound fundamentals, supported by a thorough financial and risk analysis.

2.3 Bank Risk Management Systems

The banking industry has long viewed the problem of risk management as the need to control four risks which make up most, if not all, of their risk exposure, such as; credit, interest rate, foreign exchange and liquidity risk. While they recognize counterparty and legal risks, they view them as less central to their concerns. Where counterparty risk is significant, it is evaluated using standard credit risk procedures, and often within the credit department itself. Likewise, most bankers would view legal risks as arising from their credit decisions or, more likely, proper process not employed in financial contracting (Tsorhe et al., 2015).

Accordingly, the study of bank risk management processes is essentially an investigation of how they manage these four risks. In each case, the procedure is adapted to the risk considered so as to standardize, measure, constrain and manage each of these risks. To illustrate how this is achieved, this review of firm-level risk management begins with a discussion of risk management controls in each area. The more difficult issue of summing over these risks and adding still other, more amorphous, ones such as legal, regulatory or reputational risk, will be left to the end (Tsorhe et al., 2015).

2.5 Banks Profitability and Its Measurement

Like all businesses, banks profit by earning more money than what they pay in expenses. The major portion of a bank's profit comes from the fees that it charges for its services and the interest that it earns on its assets. Its major expense is the interest paid on its liabilities.

The major assets of a bank are its loans to individuals, businesses, and other organizations and the securities that it holds, while its major liabilities are its deposits and the money that it borrows, either from other banks or by selling commercial paper in the money market. And profitability of any business area can be measured through return on assets (ROA) and return on equity (ROE). Profitability is the dependent variable of this study. The researcher tries to evaluate the profitability of commercial banks in Ethiopia.(Tandelilin, Kaaro, Mahadwartha, Supriyatna, 2007).

2.5.1 Relationship between Credit Risk Management and Bank Performance

As per different researchers and authors, Credit risk is the most significant of all risks in terms of size of potential losses. As the extension of credit has always been at the core of banking

operation, the focus of banks 'risk management has been credit risk management. When banks manage their risk better, they will get advantage to increase their performance (return). Better risk management indicates that banks operate their activities at lower relative risk and at lower conflict of interests between parties (Anthony M. Santomero, 1997).

The advantages of implementing better risk management lead to better banks performance. Better bank performance increases their reputation and image from public or market point of view. The banks also get more opportunities to increase the productive assets, leading to higher bank profitability, liquidity, and solvency. (Tandelilin, Kaaro, Mahadwartha, Supriyatna, 2007). Therefore, Effective credit risk management should be a critical component of a bank's overall risk management strategy and is essential to the long-term success of any banking organization. It becomes more and more significant in order to ensure sustainable profits in banks.

2.5.2 Banks profitability measure - Return on Asset (ROA)

According to (Flamini, McDonald, & Schemids, 2009) the habitual measures of the profitability of any business are return on assets (ROA) and return on equity (ROE). Assets are used by businesses to generate income. Loans and securities are a bank's assets and are used to provide most of a bank's income. However, to make loans and to buy securities, a bank must have money, which comes primarily from the bank's owners in the form of bank capital, from depositors, and from money that it borrows from other banks or by selling debt securities—a bank buys assets primarily with funds obtained from its liabilities as can be seen from the following classic accounting equation:

$$Asset = Liability + Bank\ Capital\ (Owners'\ Equity)$$

However, not all assets can be used to earn income, because banks must have cash to satisfy cash withdrawal requests of customers.

The ROA is determined by the amount of fees that it earns on its services and its net interest income:

Net Interest Income = Interest received on Asset – Interest paid on Liability

=Interest Earned on Securities & Loan – Interest Paid on Deposits &

Borrowing

Net interest income depends partly on the interest rate spread, which is the average interest rate earned on its assets minus the average interest rate paid on its liabilities.

Interest Rate Spreads = Average Interest rate received on Asset − Average Interest rate paid

on Liability

Net interest margin shows how well the bank is earning income on its assets. High net interest income and margin indicates a well managed bank and also indicates future profitability. As it was clearly explained by Ara, Bakaeva, and Sun (2009) the measurement of bank performance has been developed over time. At the beginning, many banks used a purely accounting-driven approach and focused on the measurement of NI, for example, the calculation of ROA.

The measurement of banks profitability using return on asset is defined as banks' after profit tax profit over total asset (Flamini et al., 2009). Since profits are a flow variable generated over the year, as opposed to the stock of total assets, we measure this ratio as a running year average, with the average value of assets of two consecutive years as a denominator. They choose ROA as the key proxy for bank profitability, instead of the alternative return on equity (ROE), because an analysis of ROE disregards financial leverage and the risks associated with it. ROA, on the other hand, may be biased due to off-balance-sheet activities, but we believe such activities are negligible in Sub Saharan Affric (SSA) banks, while the risk associated with leverage is likely to be substantial despite the institutional innovations that these financial institutions incorporate in order to compensate for informational asymmetries. (Flamini et al., 2009)

Golin (2001) Points out that ROA has emerged as key ratio for the evaluation of bank profitability and has become the most common measure of bank profitability. The following authors also used ROA as a measure of bank profitability (Berger, 1995; Yuqi, 2005), ROA reflects the ability of a bank's management to generate profits from the bank's assets. It shows the profits earned per birr of assets and indicates how effectively the bank's assets are managed to generate revenues, although it might be biased due to off-balance-sheet activities. They were used Average assets in their study, in order to capture any differences that occurred in assets during the fiscal year. ROA can be calculated as:

$$Return\ on\ Asset\ (ROA) = Net\ Profit\ After\ Tax\ /\ Average\ Total\ Assets$$

This is probably the most important single ratio in comparing the efficiency and operating performance of banks as it indicates the returns generated from the assets that bank owns.

2.5.3 Determinates of Profitability

A. Credit risk Management measure - Nonperforming loan

According to NBE NPL is a loan that is not earning income and: (1) full payment of principal and interest is no longer anticipated, (2) principal or interest is 90 days or more delinquent, or (3) the maturity date has passed and payment in full has not been made.

It is argued that the non-performing loans are one of the major causes of the economic stagnation problems. Each non-performing loan in the financial sector is viewed as an obverse mirror image of an ailing unprofitable enterprise. From this point of view, the eradication of non-performing loans is a necessary condition to improve the economic status. If the non-performing loans are kept existing and continuously rolled over, the resources are locked up in unprofitable sectors; thus, hindering the economic growth and impairing the economic efficiency. Aduda and Gitonga (2011), Chose NPLR (NPL ratio) as the independent variable because it is an indicator of risk management which affects profitability of banks. NPLR indicates how banks manage their credit risk because it defines the proportion of NPL amount in relation to TL amount. Other researchers who have used NPLR to measure credit risk include (Ara et al., 2009) and Brewer and Jackson (2006b). NPLR is defined as NPLs divided by TLs (total loans). NPL amount is provided in the notes to financial statements under loans section. Total loan amount, the denominator of the ratio, has been gathered by adding two types of loans: loans to institutions and loans to the public. The loan amount is provided in the balance sheet of the banks in their annual reports.

Thus, they used for the calculation of the NPLR in following way:

$$NPLR = (NPL\ amount) \div (TL\ amount)$$

B. Capital Adequacy Ratio (CAR)

Capital adequacy is a measure of bank`s financial strength since it shows the ability to withstand /tolerate with operational and abnormal losses. It also represents the ability to undertake additional business (Habtamu, 2012) . It is sometimes mention as Capital structure by great deal of literatures. Bank equity capital can see in two dimensions as stated by the above mentioned author. That is the amount contributed by the owners of a bank (paid-up share capital) that gives them the right to enjoy all the future earnings and the amount of owners' funds available to support a bank's business which includes reserves, and is also termed as total share holders'

funds. Bank's capital is widely used as one of the determinants of bank profitability since it indicates the financial strength of the bank, (Brewer and Jackson (2006a); Flamini et al., 2009), suggested that the bank level of safety achieved through the high capital requirements which generated positive net benefits. The degree of security exceeded the level maximizing net benefits. Capital adequacy requirements generally aim to increase the stability of a national banking system by decreasing the likelihood of a bank failure and a number of negative externalities exist in banking that cause risk to systematically under price.

Studies dealing about the capital adequacy are stated and concluded as follows. (Flamini et al., 2009) study on the effects of bank - specific, industry – specific and macroeconomic determinants of profitability on Greek bank from the period 1985 – 2001, based on the empirical framework that incorporates the traditional structure – conduct – performance (SCP) hypothesis. Applying General Movement Method (GMM) used a panel data, the investigation demonstrated that the existence of Positive correlation between returns and capital. Another research conducted by Berger (1995) on the determinants of commercial banks profitability in Sub – Saharan Africa by taking 389 sample banks in 41 SSA countries, they measuring profitability by return on asset indicators. They founded that capital adequacy has positive and significant effect on profitability. The above researcher also found that capital adequacy ratio affected ROA of USA banks positively in 1983-1989 and negatively in 1989-1992. Based on these results, the author argued that the relationship between capital adequacy ratio and profitability depending on the specific circumstances of the time period observed. According to the results of the study, a high capital adequacy ratio positively affects profitability when financial situation of banks is perceived as risky and it negatively affects profitability in normal situations due to alternative cost of capital. The main problem in benefiting from this result is the difficulty of determining an optimal level for the capital adequacy ratio.

Similar studies conducted on developing countries founded and concluded that; capital adequacy is significant company level determinants of profitability. According to Kithinji (2010) investigation the impact of bank- specific, industry- specific and macroeconomic determinants of banks' net interest margins and return on asset in the Tunisian banking industry for the 1980-2000 period. The result shows that high net interest margin and return on asset (profitability) tend to be associated with banks that hold a relatively high amount of capital. As determined by company Kolapo et al. (2012) level determinants of bank profitability evidence from Nigeria.

Using a panel data set consist of 91 observations of 33 banks over the 2000 – 2004 period. Regression desired outcomes reveled that capital size is one of significant company level determinants of profitability. Though the results indicate that capital size is a significant determinant of bank profitability in Nigeria, only the size of the reserves component of bank capital has a significant relationship with bank profitability. But the shares component of bank capital does not have a significant relationship.

Generally, there is the presence of positive relationship between profitability and capital has been supported by Flamini et al. (2009). Therefore, researchers widely posit that the more capital a bank has, the more resistant it will be to failure. However, it is expected to have Positive relation with Profitability.

It is measured by total Equity to total asset ratio.

$$CAR = \frac{Total\ Equity}{Total\ Asset}$$

C. Liquidity

Loan to deposit (LTD) ratio examines bank liquidity by measuring the funds that a banks has utilized into loans from the collected deposits. It demonstrates the association between loans and deposits. Besides, it provides a measure of income source and also measures the liquidity of bank asset tied to loan (Makri et al.2014). A bank or financial institution has to be liquid to meet payment obligations to depositors and creditors. This calls for a sound Asset Liability Management by the bank. Liquidity analysis considers the bank's ability to meet its obligations and is very critical for a bank to remain a going concern. The absence of liquidity can lead to failure of a bank. It also considers the proportion of liquid assets to total assets along with their deposit renewal rate (brickwork rating 2010). Abdus Samad et al. (2001) and Pak and Huh (1995) used loan to deposit ratio to calculate the level of liquidity in their study. The liquidity condition of the commercial banks was also reliable in all cases, thought some measures should be made by the individual banks respective to their matter as per Habtamu (2012) .A bank must always be liquid to meet depositors and creditors demand to maintain public confidence. There needs to be an effective asset and liability management system to minimize maturity mismatches between assets and liabilities and to optimize returns. As liquidity has inverse relationship with profitability, and banks must strike a balance between liquidity and profitability (Financial Management and Analysis of Projects 2006). According to Molyneux and Thornton (1992) and

Greuning and Bratanivic (1999), there is a negative and significant relationship between the level of liquidity and profitability. In contrast, Bourke (1989) reports an opposite result, while the effect of credit risk on profitability of banks appears clearly negative.

Current and quick ratios are inappropriate for measuring banks liquidity as per Brickwork rating in 2008. A loan-to-deposit ratio is more relevant. However, a bank's liquidity and solvency are directly affected by portfolio quality. Consequently, financial analysts (investment officers) are carefully analyzing the bank's portfolio quality based on collectability and loan-loss provisioning. The trade-offs that generally exist between return and liquidity risk are demonstrated by observing that a shift from short term securities to long term securities or loans a raise a bank's return but also increases its liquidity risks and the inverse in is true. The new NBE directive were issued in 2012 related to the liquidity states that private commercial banks are obligated to allocate 27 percent of their gross loan disbursement to finance government bonds. Thus, this new directive will increase liquidity and lending funds in the banking sector. As a result private banks could get temporary relief from the strain of illiquidity. They will also be able to disburse additional loans, since the additional liquid resources are beyond their operational needs (Addis fortune 15 January 2012).

$$LTD = \frac{Total\ Credit}{Deposit}$$

D. Bank Size

Studies conducted on determinants of bank profitability took bank size variable, as considered to an important determinants of bank performance (Kosmidou, 2008). If the relative size of a firm expands its market power and profits increases, this is the Market-Power (MP) hypothesis. The hypothesis also referred to as the Structure-Conduct-Performance (SCP) hypothesis (Athanasoglou, Brissimis, & Delis, 2005).

One of the most important questions underlying bank policy is which size optimizes bank profitability? Because there is no clear cut points that indicates the relation of appropriate bank size and its profitability. The effect of a growing size on profitability has proved positive to a certain extent. However, for banks that become extremely large, the effect of size could be negative due to bureaucratic and other reasons (Athanasoglou et al., 2005). The different studies regarding bank size concluded mixed empirical results. Some studies found economies of scale for large banks (e.g. Athanasoglou, Delis, and Staikouras (2006) South Eastern European banks

and Kosmidou (2008) on Greece banks,) and others concluded that diseconomies scale for large banks due to possible bureaucratic bottlenecks and managerial inefficiencies or economics of scale for small banks (e.g. (Athanasoglou et al., 2005) on Greece banks, Aburime (2008)on Nigeria banks and Ngo, 2006 Australian bank). As extensive researchers pointed out the expected sign of bank size is ambiguous. Hence, the size-profitability relationship may expect to be non-linear. The researcher use the natural logarithm of total assets as a proxy for bank size. According to Belayneh (2011) research conducted on the determinants of commercial banks profitability during the period 2001 – 2010 concluded that the size of all Ethiopian commercial banks which is measured by log of total asset is increased for the last 10 years. In case of Ethiopian commercial banks, as the result implies that larger banks enjoy the higher profit than smaller banks in Ethiopia banking sector because they are exploiting the benefit of economies of scale.

In the literature, asset and/or deposit base of banks have adopted as proxy for their size. At times, their market shares of assets and/or deposit have also used. The second set of measures, however, follows from the first. According Aburime (2008) investigation on Nigeria banking industry on the area of bank performance and supervision by adopted the data envelopment analysis approach founded that, the profitability of the bigger banks is significantly higher than that of the smaller banks.

2.6 Empirical Review

The relationship between credit risk and commercial banks performance has been the concern of emerging studies. As Yuqi (2005) a number of explanatory variables have been proposed for both categories, according to the nature and purpose of each study several factors have been suggested as impacting on profitability and these factors can further distinguish between control variables that describe the macroeconomic environment, such as inflation, interest rates and cyclical output, and variables that represent market characteristics. The latter refer to market concentration, industry size and ownership status.

The empirical findings on the relationship of bank profitability in the UK in their sample suggest that the following conclusions. First, negative and positive effect of liquidity on bank profitability has been found, with weak significant coefficient. This is in consistent with previous studies as the results concerning liquidity are mixed. Therefore, the conclusion about the impact

of UK bank's liquidity on their performance remains ambiguous and further research is required. Second, the ratio of loan loss reserves to net interest revenue has a negative impact on ROAA with statistical significance. This implies that higher credit risks results in lower profit.

As the findings shows that liquidity and credit risks do have negative impact on bank profitability, and it provides further implication on the effective risk management practices in banks.

Achou and Tenguh (2008), Shows that there is a significant relationship between banks' profitability and credit risk management. 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.

Regulation, peroxide by the amount of Reserve Fund appears to have negative impact on all three measures of risk, significantly so for liquidity risk. Depositor behavior appears to significantly impact only liquidity management, but not capital or credit risk management. There is no evidence that shareholders act in a manner that reduces the credit risk of banks. The more efficient the management, the less capital the bank is likely to hold, subject to minimum capital requirement. That is, the equity multipliers of banks with more efficient management are likely to be higher. The other evidence is that credit risk increases as management efficiency variable decreases (Tsorhe, Aboagye & Kyereboah-Coleman).

Poudel (2012) Studied the factors affecting commercial bank performance in Nepal for the period of 2001 to 2012 and followed linear regression analysis technique. The study revealed a significant inverse relationship between commercial bank performance measured by ROA and credit risk measured by default rate and capital adequacy ratio.

Hosna, Manzura, and Juanjuan (2009), also found similar result with Poudel (2012) in his study of four Swedish banks covering a period of 2000 to 2008. The result showed that rate of nonperforming loan and capital adequacy ratios was inversely related to ROE though the degrees vary from one bank to the other. Such inverse relationship between profitability performance and credit risk measures were also found in other studies Achou and Tenguh (2008) though there are a number of empirical studies evidencing the negative and significance relationship of credit risk management and commercial banks performance, concluding about this issue is somewhat difficult, because there are papers that come across with different results.For instance, (Boahene

et al., 2012) , found a positive and significance relationship of commercial banks performance and credit risk in his study of six Ghanaian commercial banks covering a period of 2005-2009. The panel data analysis model employed in the study revealed that indicators of credit risk, namely: non-performing loan rate, net charge of rate, and the pre-provision profit as a percentage of net total loans and advances were positively related with profitability measured by ROE. The author suggested that Ghanaian commercial banks enjoy high profitability at time when the levels of credit risk variables are high. It is reasoned out on this study that this might be, because of prohibitively lending/ Interest rate, fees and commissions.

The prevailing relationship between profitability and credit risk is further complicated by the finding of (Kithinji, 2010). Employing a regression analysis on data collected from financial reports of commercial banks in kenya for the period of 2004 to 2008 concluded that profitability of commercial banks measured by ROA did not show significant relationship with credit risk measures.

To the best of the researcher knowledge studies on the relationship between credit risk and profitability of Ethiopian commercial banks are few though many studies documented that credit risk is among the major challenges of banks in Ethiopia. Of these studies, (Mekash (2011); Tefera, 2012) each studied the effect of credit risk management on the performance of commercial banks in Ethiopia. Gizaw et al. (2015), are specifically studied on the relationship between credit risk and profitability of Ethiopian commercial banks, employing a regression analysis on data collected from financial reports of commercial banks in Ethiopia for the period of 2001 to 2012. All Used secondary data from annual reports of commercial banks and survey of primary data from bank managers officers which similarly showed that there is a negative relationship between credit risk and performances of commercial banks in Ethiopia.

The current study is therefore, aimed at contributing to the gap in the literature on the subject matter by expanding the sample observation both in time series and cross section so that a better picture of relationship between credit risk and profitability performance can be portrayed.

2.6 Conceptual Framework

As shown on theoretical and empirical literature review of this study arguments and conclusions, profitability and credit risk management have either positive or negative relationships. And even both variables may not have a significant interrelationship which dependents on the nature of the

commercial banking in a certain country. Different empirical evidences suggested that Credit Risk Management in banks is affected banks profitability. This study used Credit risk management indicator of non-performing loan and other control variables of banks profitability like CAP, LTDR and Bank size. The study has seen how these variables are related or affect the profitability of commercial banks in Ethiopia.

Arrows show relationship of credit risk management and profitability
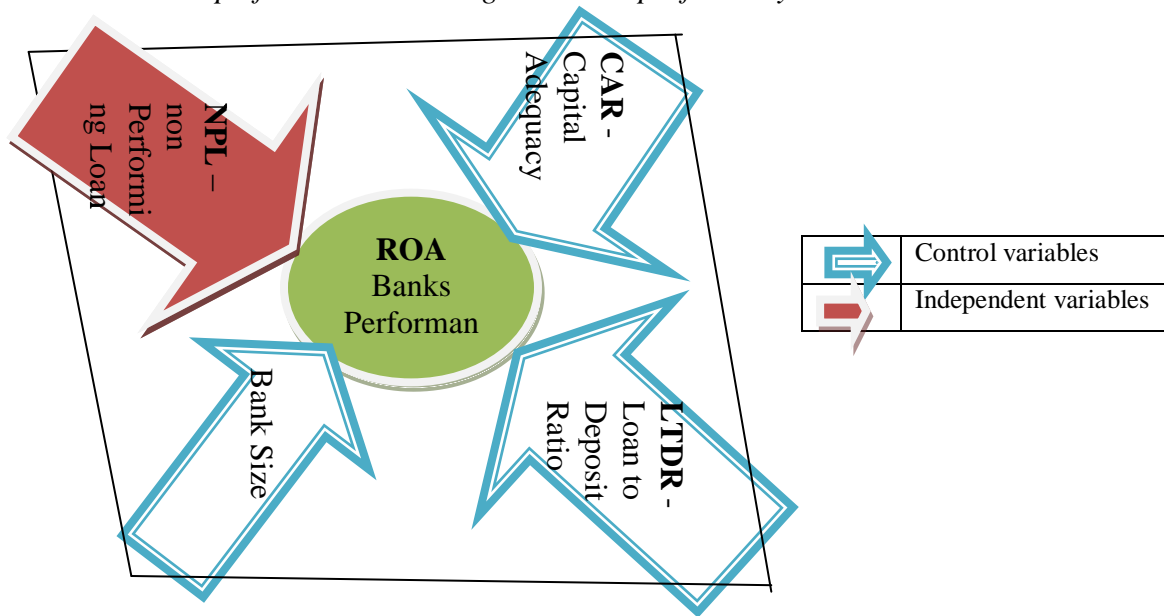
Source: own Description

Chapter Three

Research Methodology

3.1 Research Design

This research employs relational study (WIKIPEDIA, 2018). This is deemed appropriate because the study involved the relationship of credit risk management and profitability in commercial banks of Ethiopia which helped the researcher in comparing different objects. A relational study considers how individual items relate to one another (or not), with the researcher comparing different objects and asking the question 'How are these connected?'. A relational study thus requires more than one object and one or more variables that describe the relationship between them.

In this study the quantitative research approach method is employed. The survey is a non-experimental research method. Survey can be useful when a researcher wants to collect data on phenomena that cannot be directly observed. (WIKIPEDIA, 2018)

3.2 Sampling

Currently, in Ethiopia 17 Commercial banks are in operation. From these seven banks namely Commercial Bank, Awash International Bank, Bank of Abyssinia, Dashen Bank, Wegagen Bank, United Bank, and NIB International Bank has been selected by using exclusive technique (WIKIPEDIA, 2018). Exclusive Criteria sampling targets a particular group of people used when the desired population for the study is rare or very difficult to locate and recruit for a study-Exclusive Criteria sampling may be the only option the researcher used these criteria by considering age of the commercial banks reached 17 years and above.

3.3 Data Type and Methods of Data Collection

In this paper secondary data sources is used. The secondary data collected from audited financial statements and annual reports from the selected 7 out of the 17 Ethiopian commercial banks. These banks were selected because their financial statements were readily available for Seventeen years (i.e., from 2000 to 2016). As the result 119 (7 multiply by 17) total observation existed in a panel data. And the researcher used regression analysis to examine the relationship between return on asset (ROA) which is performance indicator and Non Performing Loan to

Total Loan (NPL/TL) which is loan losses indicator, and other performance indicators like CAR, LTDR and Bank size, to calculate this ratio. NPL amount is provided in the notes to financial statements under loans section. The loan amount is provided in the balance sheet of the banks in their annual reports. From the financial reports information concerning profit after tax, total asset and nonperforming loan (NPL), total capital and deposits were extracted for the analysis. On the financial statement NPL amount has been presented using different names, such as, bad debt, impaired loans, problem loans, doubtful claims and bad loans.

3.4 Variable Definition (Research Hypothesis)

The researcher was expected with better credit risk management have high return on asset (ROA) and lower non-performing loan. Accordingly with the help of empirical data on selected firms the study was established and tests the following hypothesis:

Hypothesis 1 (H0): Credit risk management has no significant relationship on the Profitability of Banks.

3.4.1 Dependent Variable

The researcher used Return on Asset (ROA) as the indicator of the profitability. ROA has been widely used in earlier researches Flamini et al. (2009). In addition, use of ROA as the indicator of profitability will enhance accuracy in that the required information is available in the annual reports of the banks.

Since profits are a flow variable generated over the year, as opposed to the stock of total assets, they measure this ratio as a running year average, with the average value of assets of two consecutive years as a denominator. ROA is the key proxy for bank profitability, instead of the alternative return on equity, because an analysis of ROE disregards financial leverage and the risks associated with it. Therefore, in this study ROA being used as performance indicator for the under considered commercial banks, but in this research the denominator is taken as the stock of total assets by rejecting moving average.

3.4.2 Independent Variables and Their Measurement

In this particular research NPLR has been considered as an independent (explanatory) variable. When the researcher examines the relationship of ROA with NPLR other variables like CAR, LTDR and Bank size have taken as a control variables. NPLR is identified as utmost important

indicator for banks' performance (Belete, 2013; Gizaw et al., 2015) and, (Ara et al., 2009) . NPLR is measured as the proportion of NPL to total loan (NPLR = NPL ÷ Total loan). And it expected to be negative relation to ROA.

Another independent variable the researcher chooses Capital Adequacy Ratio (CAR), because it is also an indicator of risk management which affects profitability of banks. CAR indicates how banks manage their Capital to the required level, because, it helps the commercial banks to take an action in advance from risk of loss. Researchers who have used CAR to measure credit risk include (Habtamu, 2012; Tsehay, 2012). It defines the proportion of Gross Capital amount in relation to Total Asset amount (CAR = Gross Capital ÷ Total Asset).

The third independent variable the researcher chooses Loan and advance to deposit ratio (LTDR). To measure banks liquidity this research paper employed Loan to Deposit Ratio. This ratio indicates the ability of banks to withstand deposit withdrawals and willingness of banks to meet loan demand by reducing their cash assets. When the banks are more liquid, they can reduce risk of insolvency. This ratio provides more general information on the issue deposit because it takes no account the mix between time and demand deposit, and other issues. Even so, LTDR can be used as useful tools for assessing Banks liquidity (Willem, 2013; Alemayhu, 1991). Thus, calculation of the LTDR has been accomplished by the proportion of Loan and Advance amount in relation to Total Deposit Liability amount (LTDR = Loan and Advance ÷ Total Deposit liability).

The fourth independent variable the researcher chooses bank size. Studies conducted on determinants of bank profitability took bank size variable, as considered to an important determinants of bank performance (Athanasoglou et al., 2005; Kosmidou, 2008). The effect of a growing size on profitability has proved positive to a certain extent. However, for banks that become extremely large, the effect of size could be negative due to bureaucratic and other reasons (Athanasoglou et al., 2005). According to Belayneh (2011) research conducted on the determinants of commercial banks profitability during the period 2001 – 2010 concluded that the size of all Ethiopian commercial banks which is measured by log of total asset is increased for the last 10 years. According Aburime (2008), investigation on Nigeria banking industry on the area of bank performance and supervision by adopted the data envelopment analysis approach founded that, the profitability of the bigger banks is significantly higher than that of the smaller

banks. Thus, in this study also the value of the Bank Size has been determined by logarithm of Total Asset.

The Empirical Model:

The regression analysis was conducted to find out the relationship between credit risk management (one of Loan lose indicator – Non Performing Loan) and one of profitability indicator – Return on Asset) in commercial banks. The specification of the model for the study is based on the empirical works of (Kolade et al., 2012; M. Gizaw et al., 2013; Josiah Adud et al., 2011). The researcher employed the following regression model presented below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mu$$

Where:

- ❖ Y is the dependent variable i.e. ROA (Return on Asset) - profitability indicator;
- ❖ $B_0 \rightarrow$ The constant term;
- ❖ $\beta_1 - \beta_4 \rightarrow$ The coefficients of variables;
- ❖ $X_1 - X_4 \rightarrow$ independent variables i.e. *NPLR (Non Performing Loan Ratio)* - credit risk management, CAR (Capital Adequacy Ratio), LTDR (Loan To deposit Ratio) and Bank Size respectively.
- ❖ $X2 - X_4$ taken as a control variable in this study.
- ❖ $\mu \rightarrow$ Disturbance term

    Thus the regression equation becomes:

$$ROA = \beta_0 + \beta_1 NPLR + \beta_2 CAR + \beta_3 LTDR + \beta_4 Bank\ size + \mu$$

3.5 Method of Data Analysis

As mentioned above this study is relational study and the data used in this study is fully quantitative. The study employed random effect estimation techniques and the data has been organized under the panel and using STATA software application.

3.5.1 Fixed Effect

Reyna (2007); Use fixed-effects whenever interested in analyzing the impact of variables that vary over time. Fixed effect explores the relationship between predictor and outcome variables within an entity (country, person, company, etc.). Each entity has its own individual characteristics that may or may not influence the predictor variables (for example, being a male

or female could influence the opinion toward certain issue; or the political system of a particular country could have some effect on trade or GDP; or the business practices of a company may influence its stock price).

When using fixed effect we assume that something within the individual may impact or bias the predictor or outcome variables and we need to control for this. This is the rationale behind the assumption of the correlation between entity's error term and predictor variables. FE removes the effect of those time-invariant so we can assess the net effect of the predictors on the outcome variable.

The equation for the fixed effects model becomes:

$$Yit = \beta1Xit + \alpha i + uit$$

Where;

– αi (i=1….n) is the unknown intercept for each entity (n entity-specific intercepts).
– Yit is the dependent variable (DV) where i = entity and t = time.
– Xit represents one independent variable (IV),
– $\beta1$ is the coefficient for that IV,
– uit is the error term

3.5.2 Radom Effect

The rationale behind random effects model is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent, Reyna (2007), variables included in the model:

"…the crucial distinction between fixed and random effects is whether the unobserved individual effect embodies elements that are correlated with the repressors in the model, not whether these effects are stochastic or not".

If you have reason to believe that differences across entities have some influence on your dependent variable then you should use random effects. An advantage of random effects is that you can include time invariant variables (i.e. gender). In the fixed effects model these variables are absorbed by the intercept.

The random effects model is:

$$Yit = \beta X_{it} + \alpha + u_{it} + \varepsilon_{it}$$

$$U_{it =} \text{ Between-entity error}$$

$$\varepsilon_{it} = \text{Within-entity error}$$

Random effects assume that the entity's error term is not correlated with the predictors which allows for time-invariant variables to play a role as explanatory variables.

In random-effects you need to specify those individual characteristics that may or may not influence the predictor variables. The problem with this is that some variables may not be available therefore leading to omitted variable bias in the model. Random effect allows generalizing the inferences beyond the sample used in the model (Reyna, 2007).

3.5.3 Hausman Test

To decide between fixed or random effects you can run a Hausman test where the null hypothesis is that the preferred model is random effect vs. the alternative the fixed effects (see Green, 2008). It basically tests whether the unique errors (ui) are correlated with the repressors the null hypothesis is they are not (Reyna, 2007).

The Hausman Test evaluates the Null hypothesis that the coefficient estimated by the random effect estimator is the same as the ones estimated by the constant fixed effect estimator. If the Hausman test is significant (Prob > Chi2 less than .05), then the fixed effects model will be used (Reyna, 2007). In this study, the choice between the fixed and random effects model determined by the husman test which led the researcher to use the random effects model.

In general, credit risk management policies for commercial banks were identified as conservative, stringent, lenient and customized and globally standardized credit risk management policies. Data on the level of nonperforming loans and profits collected for the period 2000 to 2016. Amount of nonperforming loans measured using nonperforming loans divided to total loans, and profits measured using ROTA (Return on Total assets) or net profit after tax divided by total asset. The trend of level of nonperforming loans and profits are established during the specified period, are presented and analyzed.

Chapter Four

Data presentation and Analysis

4.1 Results and Discussion

This chapter deals with the results of study which include the descriptive statistics, the correlation test results, the diagnosis test for the model, and regression analysis for the profitability measures of return on asset.

The description of the data and other description methods are presented. Several diagnostics tests are also run to see if there is any problem related to the statistical techniques to be used as indicated in the methodology section. The pair wise correlation coefficient matrix between the independent variables indicates that no multicollinearity problem in the model. The maximum correlation (0.75) is between bank size and loan to deposit ratio (LTDR) where as all the rest variables are less than this.

Regarding the choice between the fixed and random effects model, it is determined by the husman test which led the researcher to use the random effects model. (All this diagnostic tests results can be found in the appendix).

4.2 Descriptive Statistics of Variables

The descriptive statistics for all variables is presented below.

Variable	Obs	Mean	Std. Dev.	Min	Max
roa	119	.0247866	.0128081	-.0213	.1162
nplr	119	.0964008	.0854442	.0002	.4209
car	119	.119321	.0435926	.04	.2803
ltdr	119	.6644874	.152603	.3	1.0158
banksizeas~t	119	9.760663	.6762947	8.1987	11.5851

Return on Asset has a positive mean value 2.5% with a standard deviation of 1.3%. According to Flamini et al. (2009) ; a 2% rate of return on asset obtained in their study of banks in Sub-Saharan African countries was viewed as higher than that of in other parts of the world, In

Addition according to (Flamini et al., 2009) the mean value of Ethiopian Commercial banks ROA was 2.36%. Hence it can be argued that currently Ethiopian Commercial banks had been efficient enough to generate a higher rate of return out of their asset. The standard deviation 1.3% roughly indicates the absence of significant differences in their return on asset ratio.

The average Nonperforming Loan in Ethiopian commercial banking industry for the last 17 years was 9.6% with standard deviation of 8.5%. The difference between minimum value (0%) and maximum (42%) and the standard deviation demonstrated that there existed high variability with the NPL ratio. The result in general implied that the accumulation of NPL which was claimed as critical problem of the banking sector on previous studies showed an improvement over time. For example the recent study (Gizaw et al., 2015) showed the mean average of NPL is 12.35%.

Capital Adequacy Ratio shows the proportion of total capital to total asset. Central Banks use CAR as a protection of the depositors' money from credit risk and other failures. For this reason the minimum CAR is determined by the regulatory agencies. Internationally BASEL set 8% CAR for commercial banks. According to National bank of Ethiopia directive No SBB/24/99 the minimum requirement of CAR for Ethiopian banks is also 8%, but the result on descriptive table indicated that the mean value for the last 17 years was 11.93% with a standard deviation of 4.35%. The minimum and maximum values were also 4 and 28 percent respectively. The average amount of CAR is higher than the minimum capital requirement of BASEL and NBE showing that the bank has ability to bear loss results from loan default and other operational shocks. However, higher CAR may also diminish the profitability, competitive ability and growth capability of the banks for the fact that shareholders' fund is kept idle (Ezike and Oke, 2013). Thus requires consideration of commercial bank managers and the NBE. Even there is a slight increment observed in this study as compared to previous studies results like Gizaw et al. (2015) got 11.5%.

The ratio of loan and advance to deposit is the most commonly used measure of bank liquidity. The ratio can also indicate how far the bank used depositors fund on credit activity which is drive to default risk. The average LTDR of Ethiopian banks was found 66.44% with standard deviation of 15.26%. The maximum and minimum values were 30 and 101.5 percents respectively. Suggesting that, the banks concentrate on lending business which is, relatively riskier than other options to use depositor money. The maximum value also rises on how banks

lend in excess of their total deposit and engaged in high risk taking activity. Bank size has mean value of 9.7607 and standard deviation of 0.6763 which indicates the presence of high variability in firm sizes.

4.3 Correlation Analysis

In this section the correlation between variables (return on asset, nonperforming loan, capital adequacy, liquidity and bank size) is presented and analyzed. A correlation matrix used to measure the relationship among explanatory variables as well with the dependent variable. Cooper & Schindler (2009) suggested that a correlation coefficient above 0.8 between explanatory variables should be corrected as it is the sign of multicollinearity problem. On the other hand Mashotra (2007) argued that the correlation coefficient can be above 0.75. Hair et al. (2006) also argued that the correlation coefficient below 0.9 may not cause serious multicolinarity problem. Thus, based on the above idea the result of the correlation coefficient of this study is presented and discussed as follows.

Table 4.2 Correlation matrix: ROA

```
. correlate roa nplr car ltdr banksizeasset
(obs=119)

                   roa      nplr       car      ltdr banksi~t
        ────────────────────────────────────────────────────
             roa    1.0000
            nplr   -0.4940    1.0000
             car    0.1118   -0.0476    1.0000
            ltdr   -0.1378    0.0500    0.4261    1.0000
     banksizeas~t   0.3299   -0.3075   -0.4308   -0.7515    1.0000
```

Source: Stata output from commercial banks of Ethiopia financial statements

In table 4.2 above, the correlation between return on asset, nonperforming loan, capital adequacy, liquidity and bank size is presented. As the result it indicates, Return on asset is negatively correlated with NPL and LTDR whereas it positively related with CAR and Bank size. Due to the fact that, there is no evidence that shows multicolinearity problems among

explanatory variables since all explanatory variables coefficient is below 0.8 as shown on the above correlation output.

4.4 Regression Analysis: Results and Discussions

Based on the above correlation test there is not multicolinearity problem. Thus we can proceed to the regression analysis and discussion if the problem is not existed. But as per hetroskedasticity test the researcher found hetroskedasticity problem. In order to solve this problem the researcher used the option 'robust' to obtain hetrokdasticity robust standard error. The researcher also used husman test, as the result random effects model is good.

Econometrically, when the overall probability (P) value (Prob > F) is between 0 and 0.05 then the model is strong and has high predictive power and that significant results will be achieved when used in other studies. The model used for the analysis of this study has a high predictive power of 0.00 (i.e. Prob > F = 0.00).

As shown on the following regression result NPLR is statically significant at 1%. CAR and bank size are also statistically significant at 5%. Whereas LTDR is statistically insignificant since its P-value is above 10%.

```
. xtreg roa nplr car ltdr banksizeasset, re robust

Random-effects GLS regression              Number of obs      =        119
Group variable: id                         Number of groups   =          7

R-sq:  within  = 0.3292                     Obs per group: min =         17
       between = 0.1406                                    avg =       17.0
       overall = 0.3172                                    max =         17

Random effects u_i ~ Gaussian              Wald chi2(4)       =     784.14
corr(u_i, X)       = 0 (assumed)            Prob > chi2        =     0.0000

                                (Std. Err. adjusted for 7 clusters in id)
```

roa	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
nplr	-.0528556	.0082838	-6.38	0.000	-.0690916	-.0366196
car	.0620746	.0200686	3.09	0.002	.022741	.1014082
ltdr	.0052529	.0068124	0.77	0.441	-.0080992	.0186051
banksizeas~t	.0075198	.0028044	2.68	0.007	.0020232	.0130163
_cons	-.0544133	.0304487	-1.79	0.074	-.1140917	.0052652
sigma_u	.00346344					
sigma_e	.01063179					
rho	.09594025	(fraction of variance due to u_i)				

According to the result NPLR had a negative effect on ROA. This implies that 1% increase of non-performing rate causes 5.7% decrease return on asset (ROA). Therefore, NPL has a negative impact on banks performance. The result is consistent with the findings of (Gizaw et al., 2015; Hosna et al., 2009; Kithinji, 2010; Mekash, 2011; Poudel, 2012; Tefera, 2012) .

Similarly, 1% increases of CAR and bank size results a 6.5% and 0.6% increase of return on asset, respectively. Loan to deposit ratio (LTDR) is statically insignificant, this implies that this variable couldn't explain dependent variable (ROA). This result is also similar with (Athanasoglou et al. (2005); Flamini et al., 2009). It also supported by Aburime (2008) found that there is positive relationship between bank size and profitability.

Thus, the main objective of this study was "to examine the effects of NPLR on return on asset (ROA)''. To draw the final conclusion, the study was go through the null hypothesis says "Credit risk management has no significant relationship on the profitability of the bank". Based on the findings of the above regression analysis, the null hypothesis is rejected since the credit risk management measured by non-performing loan rate had statistically significant effect at 1% on profitability of selected commercial banks in Ethiopia which is measured by return on asset(ROA).

Chapter Five

Summary Conclusion and Recommendation

It is fact; a strong and healthy financial system is a prerequisite for sustainable economic growth of a given country. Because of this, the current study specified an empirical framework to investigate the effect of Credit Risk Management on the profitability of Ethiopian commercial banks from 2000 to 2016. Over the last seventeen years a number of important changes occurred in the Ethiopian commercial banking industry. The study also used an appropriate econometric methodology for the estimation of variables coefficient under random effect technique. The following sections discussed about the final conclusion remarks of the study and applicable recommendations.

5.1 Summary

As discussed before from chapter four empirical results, the coefficient of the explanatory variable Credit Risk (its indicator NPL) has a negative and highly significant relationship with profitability in Ethiopian commercial banking sector ROA model at 5% significance level. Since CR has negative and significant relationship on profitability of the sector.

This study confirms the coefficient of the other explanatory variable capital adequacy ratio (CAR) is statistically significantly related with profitability for ROA at 5% significance level. This reflects efficient capital is the main determinant of asset return performance of the commercial banks of Ethiopia.

Concerning the liquidity risk for this study which is measured by LTDR, the regression results in this research imply that the relation between liquidity risk and ROA is positive but not significant at 5% significance level. So it is not capable for estimation of the model. If we drop it and run the model again, other variables may show better picture of significance level.

Next, the researcher find bank size has Positive and significant effect on profitability in terms of asset return at 5% significant level. From this result the researcher conclude that, in Ethiopia banking industry the large size banks (e.g. CBE) are positively affected their profitability by their size. Even if as some study indicates if the bank size comes to extreme, probably, this might due

to the existence of bureaucratic bottlenecks system and managerial inefficiencies to manage their assets, may affect profit negatively.

Generally, according to the regression result capital adequacy and bank size have common significant effects on Commercial banks of Ethiopia. However, credit risk has negative and significant effect on performance of commercial banks of Ethiopia.

5.2 Conclusion

Based on the findings of the study, the following conclusions are made. The study tries to identify the prevailing relationship of credit risk management, capital adequacy ratio, liquidity ratio and bank size with that of profitability performance of commercial banks in Ethiopia. The results of the previous studies were not conclusive. To fill such gap this study has conducted using data somehow longer than other studies.

According to the regression analysis there is a negative and significant relationship between ROA and NPL. Thus, NPL has a decreasing impact on commercial banks performance. Since NPL one of the credit risk measure has negative and significant relation on profitability of the sector indicates the problem symptom of asset quality is present in Ethiopian commercial banking industry.

The average amount of CAR is higher than the minimum capital requirement of BASEL and NBE. However, higher CAR may also diminish the profitability, competitive ability and growth capability of the banks for the fact that shareholders' fund is kept idle (Ezike and Oke, 2013).

On the other hand CAR, LTDR and Bank size do affect banks profitability but LTDR showed insignificant. This means that according to this study CAR and Bank size contributed positively for the profitability of banks. The researcher concludes that, efficient capital is the main determinants of asset return performance of the commercial banks of Ethiopia. When the researcher drops the explanatory variable LTDR (since it is irrelevant to include), the quality of other explanatory variables have increased.

5.3 Recommendation

From the findings of the study, the following recommendations are forwarded.

- Commercial banks should give great attention to manage their loans to improve their performance through proper risk identification and mitigation before granting loan.

- Since the average amount of CAR is higher than the minimum capital requirement of BASEL and NBE still it requires consideration of commercial bank managers and the NBE to regulate CAR to meet the required rate.

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Appendix

```
. xtreg roa nplr car ltdr banksizeasset, fe

Fixed-effects (within) regression              Number of obs      =        119
Group variable: id                             Number of groups   =          7

R-sq:  within  = 0.3317                        Obs per group: min =         17
       between = 0.0193                                       avg =       17.0
       overall = 0.2997                                       max =         17

                                               F(4,108)           =      13.40
corr(u_i, Xb)  = -0.1274                        Prob > F          =     0.0000

─────────────┬────────────────────────────────────────────────────────────────
         roa │      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
─────────────┼────────────────────────────────────────────────────────────────
        nplr │  -.0470157   .0146066    -3.22   0.002    -.0759685   -.0180628
         car │   .0477966   .0360643     1.33   0.188    -.0236891    .1192822
        ltdr │   .0055669   .0108817     0.51   0.610    -.0160026    .0271363
banksizeas~t │   .0088575   .0029394     3.01   0.003      .003031    .0146839
       _cons │   -.066538   .0342337    -1.94   0.055    -.1343952    .0013191
─────────────┼────────────────────────────────────────────────────────────────
     sigma_u │  .00366494
     sigma_e │  .01063179
         rho │  .1062083   (fraction of variance due to u_i)
─────────────┴────────────────────────────────────────────────────────────────
F test that all u_i=0:     F(6, 108) =      1.42              Prob > F = 0.2119

. estimates store fixed

. xtreg roa nplr car ltdr banksizeasset, re

Random-effects GLS regression                  Number of obs      =        119
Group variable: id                             Number of groups   =          7

R-sq:  within  = 0.3292                        Obs per group: min =         17
       between = 0.1406                                       avg =       17.0
       overall = 0.3172                                       max =         17

Random effects u_i ~ Gaussian                  Wald chi2(4)       =      54.82
corr(u_i, X)      = 0 (assumed)                Prob > chi2        =     0.0000

─────────────┬────────────────────────────────────────────────────────────────
         roa │      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
─────────────┼────────────────────────────────────────────────────────────────
        nplr │  -.0528556   .0133466    -3.96   0.000    -.0790144   -.0266968
         car │   .0620746   .0291549     2.13   0.033     .0049321    .1192171
        ltdr │   .0052529   .0104806     0.50   0.616    -.0152887    .0257945
banksizeas~t │   .0075198   .0026487     2.84   0.005     .0023285     .012711
       _cons │  -.0544133     .03216    -1.69   0.091    -.1174457    .0086191
─────────────┼────────────────────────────────────────────────────────────────
     sigma_u │  .00346344
     sigma_e │  .01063179
         rho │ .09594025   (fraction of variance due to u_i)
─────────────┴────────────────────────────────────────────────────────────────

. estimates store random
```

```
. hausman fixed random

                 ―― Coefficients ――
              |    (b)         (B)          (b-B)      sqrt(diag(V_b-V_B))
              |   fixed       random      Difference         S.E.
--------------+------------------------------------------------------------
         nplr |  -.0470157   -.0528556     .0058399        .0059348
          car |   .0477966    .0620746    -.014278         .021228
         ltdr |   .0055669    .0052529     .0003139        .0029271
 banksizeas~t |   .0088575    .0075198     .0013377        .0012747
--------------+------------------------------------------------------------

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

    Test:  Ho:  difference in coefficients not systematic

             chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                     =        1.15
           Prob>chi2 =      0.8855
```

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (7) =   451.24
Prob>chi2 =   0.0000

```
. xtset id year
       panel variable:  id (strongly balanced)
        time variable:  year, 2000 to 2016
                delta:  1 unit

.
. xtserial roa nplr car ltdr banksizeasset

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,       6) =      2.923
          Prob > F =      0.1382
```