The Impact of Credit Risk Management on Performance of Banks: The Case Study of Selected Commercial Banks in Ethiopia

A Thesis Submitted to the School of Graduate Studies of Jimma University in Partial Fulfillment of the Requirements for the Award of the degree of Master of Science (MSC) in Economic Policy Analysis

By:

MUHIDIN MUSTEFA SEID

JIMMA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

MSC IN ECONOMIC POLICY ANALYSIS

JUNE, 2016

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Board of Thesis Examination

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JIMMA, ETHIOPIA

CERTIFICATE

This is to certify that the thesis entitles "*The Impact of Credit Risk Management on Performance of Banks: The Case Study of Selected Commercial Banks in Ethiopia"*, submitted to Jimma University for the award of the Degree of MSC in Economic Policy Analysis is a record of bona fide research work carried out by Mr. *Muhidin Mustefa Seid*, under our guidance and supervision.

Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.

Main Advisor's Name	*Date*	*Signature*
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Co-Advisor's Name	*Date*	*Signature*
_____	_____	_____

DECLARATION

I hereby declare that this thesis entitled "the impact of credit risk management on performance of Banks: the case study of selected Commercial Banks in Ethiopia", has been carried out by me under the guidance and supervision of Dr. Wondaferahu Mulugeta and Mr. Muhidin Muhammedhussen.

The thesis is original and has not been submitted for the award of any degree or diploma to any university or institutions.

Researcher's Name   Date   Signature

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ABSTRACT

This study is aim at examining the impact of credit risk management on the performance of commercial banks in Ethiopia. Thus, the major focus is to investigate empirically bank specific, industry specific and macroeconomic factors that affect banks performance. In this study, the researcher used only secondary sources of data. Data to do the analysis is obtained from annual report of each selected commercial banks, National Bank annual report and MoFED. The study used eight selected commercial banks which served in the industry for elven years and above among seventeen commercial banks which is functional at the moment in Ethiopia banking industry. The study used panel data random effect model for analysis methods of the impact of credit risk management on performance commercial banks in Ethiopia over the years 2005 to 2015. The collected data were analyzed by using stata version- 12 econometric soft were for running descriptive and regression analysis. Return on asset used as a dependent variable whereas non- performing loan ratio, deposit growth rate, income diversification, bank size, industry concentration, interest rate spread, GDP growth rate and inflation growth rate as an independent variable. The panel data random effect model result shows that the credit risk which is measured by non-performing loan ratio, deposit growth rate and interest rate spread had a significant inverse impact on banks performance while income diversification and industry concentration have a positive significant impact on banks performance. In addition, the study founds bank specific factors like bank size and macroeconomics variable such as GDP growth and Inflation rate had no significant impact on banks performance. In general, this study concluded that Bank Specific factors, industry specific factors and macroeconomics variable factors had a significant impact on banks performance though the bank specific factors has a greatest impact of all other.

Keywords: Credit Risk, Bank Performance, Bank Specific, Industry Specific, Macroeconomic factors.

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Table of Content

List of Tables

List of acronyms

BS   Bank Size

CAMEL   Capital, Asset, Management, Earning, and Liquidity

CAR   Capital Adequacy Ratio

CLRM   Classical Linear Regression Model

DGR   Deposit growth Rate

EBIT   Earnings before Interest and Tax

GCC   Gulf Cooperation Council

GDP   Gross domestic Product

IDN   Diversification

IMF   International Monetary Fund

INF   General Inflation rate

LPTTLR   Loan Loss Provision to Total loan Ratio

LTD   Loan to Deposit Ratio

MBG   Merchant Bank Ghana

MEF   Management efficiency

MENA   Middle East and North Africa

MoFED   Ministry of Finance and Economic Development

NAQ   Net Asset Quality

NBE   National Bank of Ethiopia

NIM   Net Interest Margin

NPL   Non-performing loans

NPLR   Non-performing Loan Ratio

ROA   Return on Assets

ROE   Return on Equity

CHAPTER- ONE

1.1. Background of the study

Credit risk is the possibility that a borrower or counter party will fail to meet agreed obligations. To those authors (Saunders & Cornet, 2008 and Al-Smadi & Ahmed, 2009) credit risk is the risk that the promised cash flows from loans and securities held by financial institutions may not be paid in full. Credit risk is the main cause of bank failures, and the most visible risk facing banks' managers (Gup et al, 2009). According to Rose and Hudgins (2008) credit risk is defined as the probability that some of the financial institution's assets, especially its loans, will decline in value and perhaps become worthless. Another study by Al-Smadi and Ahmad (2009) also indicated that an in-depth investigation and understanding on the manner in which internal and external factors contribute to credit risk warrant further analysis. At macro level, GDP, inflation and market interest rate have been identified as having significant impact on credit risk while at micro level; previous non-performing loans, loan growth, loan concentration and bank size are significant determinants. Therefore credit risk management is very important to banks as it is an integral part of the loan process. It maximizes bank risk, adjusted risk rate of return by maintaining credit risk exposure with view to shielding the bank from the adverse effects of credit risk.

The Financial institutions play a crucial role of financial intermediaries between lenders and borrowers. Financial intermediaries are an institution that acts as an intermediary by matching supply and demand of funds (Beck, 2001). According to Heffernan (1996) banks are an intermediaries between depositors and borrowers in an economy which distinguished them from other types of financial firms by offering deposit and loan. Bossone (2001) also agrees and arguing that banks are special intermediaries because of their unique capacity to finance production by lending their own debt to agents willing to accept it and to use it as money. Another study by (Farhan et al, 2012) also stated out the role of intermediaries' eases the flow of credit in the economy and additionally boosts the productivity by revitalizing the investment. The increase in production lead to economic growth and economic growth will not take place in the absence of a sound financial sector. This results also supported by (Khan and Senhadji, 2001) good performance of the financial institutions symbolizes good prospects of economic growth.

In connection with above as the definition of (Aktan& Bulut, 2008) financial performance of a company is the ability to generate new resources, from day-to-day operation over a given period of time and it is evaluated by net income and cash from operation. In the period of the 1980's and 1990's when the financial and banking crises became worldwide, new risk management banking techniques emerged. In the financial area, enterprise risks can be broadly categorized as credit risk, operational risk, market risk and other risk. Among those risks, the management of credit risk would be a vital factor as the losses of loans directly affect banks' performance(Campbell,2007).

Beyond the intermediation function the commercial banks has also played a great role, in that they rewards the shareholders for their investment as a result of good financial performance. This further encourages additional investment and brings about economic growth while poor banking performance can lead to banking failure and crisis which have negative repercussions on economic growth. Therefore, the greater importance is their role of financing economic activity in most economies (Ongore and Kusa, 2013). Hence, the study of the impact of credit risk management on the performance of the bank profitability becomes an important issue which could help banks understand the current conditions of the banking industry they are involved in and the critical factors they should consider in making decisions and creating new policies either for recovery or improvement. This things are motivated the researcher to conduct study on the impact of credit risk management on the performance of commercial banking industry in Ethiopia.

1.2. Statement of the problem

Banks are the largest financial institutions around the world, with branches and subsidiaries. There are plenty of differentiations between types of banks and much of this differentiation rests in the products and services that banks offer (Howells & Bain, 2008). For instance, commercial banks hold deposits, bundling them together as loans, operating payments mechanism.

The very nature of the banking business is so sensitive in that more than 85% of their liability is from depositors deposits (Saunders & Cornett, 2005). Banks use these deposits to generate credit for their borrowers, which in fact is a revenue generating activity for most banks. This credit creation activities exposes the banks to high default risk which might led to financial distress including bankruptcy.

Bank failures are caused by a combination of factors. According to Herrero (2003), poor bank profitability, low net interest margins and low GDP as some of the causes of bank failure. He categorizes these factors into bank specific and macroeconomic factors. Among the bank specific factors are asset quality, management quality, earnings and liquidity as the key factors while high interest rates, low economic growth, adverse trade shocks, exchange rate movements and foreign liabilities are classified as the macroeconomic factors. Hooks (1994) also postulates that bank failures arise due to the banks do not keep all their deposits in statutory reserve funds. As result of some regulatory bodies restrain the banks to hold over the minim deposit set. However, this contributes to bank failures by permitting distressed banks to continue operating instead of liquidating them. The distressed banks, who are allowed to operate, face deterioration in their capital situation as they lack adequate funds.

Despite the above factors, (Tay, 1991) examined banking crisis is mostly come from the absence of good managerial ideas in management decision making. In addition to good managerial ideas, Competence and focus play is a major role in banking industry. In contrary to this poor management, especially excessive risk taking, is the main cause of bank failure (Lepus, 2004). According to study conducted by Marrison (2002) the main activity of bank management is not only deposit mobilization and giving credit but also

need to practice effective credit risk management in order to reduce the risk of customer default. The effect of credit risk management competitive advantage of a bank is dependent on its capability to handle credit valuably. In contrary of this, bad loans cause bank failure as the failure of a bank is seen mainly as the result of mismanagement because of bad lending decisions made with wrong appraisals of credit status or the repayment of nonperforming loans and excessive focus on giving loans to certain customers.

Previous literature conducted on the impact of credit risk management on performances of banks, Kithinji (2010) examined the effect of credit risk management on the profitability of commercial banks in Kenya. Data on the amount of credit, level of non-performing loans and profits were collected and analyzed for the period 2004 to 2008. The findings revealed that the bulk of the profits of commercial banks are not influenced by the amount of credit and non-performing loans, therefore suggesting that other variables other than credit and non-performing loans impact on profits.

In contrary to this, study conducted by Felix and Claudine (2008) on the relationship between bank performance and credit risk management concluded that bank profitability measured by return on equity (ROE) and return on assets (ROA) were inversely related to the ratio of non-performing loan to total loan of financial institutions thereby leading to a decline in profitability.   Kargi (2011) also investigated the impact of credit risk on the profitability over the Nigerian banks. His findings indicated that credit risk management has a significant impact on the profitability of Nigerian banks. He concluded that banks' profitability is inversely influenced by the levels of loans and advances, non-performing loans and deposits thereby exposing them to great risk of illiquidity and distress. Additionally, study by Epure and Lafuente (2012) also examined that bank performance in the presence of risk for Costa-Rican banking industry during 1998-2007. The results was shows that performance improvements follow regulatory changes and that risk explains differences in banks and non-performing loans negatively affect efficiency and return on assets while the capital adequacy ratio has a positive impact on the net interest margin.

Similarly, study conducted on the impact of credit risk management on the performance of commercial banks in Ethiopia, Mekash (2011) examined the effect of credit risk management on the performance of commercial banks in Ethiopia and Tesfaye (2014) with the title of the Determinants of Ethiopian Commercial Banks Performance. Both study result showed that there was a negative relationship between credit risk factors such as non-performing loan ratio and loan loss provision ratio to the performance of commercial banks in Ethiopia. On the contrary to this the research conducted by Million (2014) shows there was significant positive relationship between Loan loss provision and performance of commercial banks in Ethiopia.

Though different studies are conducted on the impact of credit risk management on banks performance, their result is not conclusive as far as the impacts of the factors are concerned. This implies that, there is no consensus in the banking literature regarding on the impact of credit risk management on bank performance.

Additionally, as per the researcher knowledge most of the study conducted in Ethiopia on this title consider the bank specific(internal) factors, only few study has been conducted by considering the bank specific, Industry specific and macroeconomics specific factors to measure bank's performance. Hence, this study aims to fill the gap in the literature by focusing on bank specific, Industry specific and macroeconomics specific factors impact of credit risk management on the performance of commercial banks in Ethiopia.

Therefore, the main purpose of this research was to examine the impact of credit risk management on the performance of commercial banks in Ethiopia by using return on asset as performance indicator of banks. This will equip financial managers with applied knowledge of determining their Credit risk management and play role in filling gap in understanding of the Credit risk management on performance of Commercial banks in Ethiopia.

1.3. Objective of the study

1.3.1. General objective of the study

The general objective of this study was to examine the impact of credit risk management on performance of Commercial banks in Ethiopia.

1.3.2. Specific objective of the study

In addition to the above general objective the researcher develop the following specific objective

❖ To examine the impact of bank specific factors on Performance (Profitability) of Commercial banks in Ethiopia measured by Return on Asset (ROA).

❖ To analyze the impact of Industry specific factors on banks Performance (Profitability) of Commercial banks in Ethiopia measured by Return on Asset (ROA).

❖ To investigate the impact of macroeconomic determinants variable on banks Performance (Profitability) of Commercial banks in Ethiopia measured by Return on Asset (ROA).

1.4. Significance of the Study

The findings from this study will be important to for the Commercial banking sectors in Ethiopia in that it will provide information about credit risk management and its effect on financial performance and this information will particularly be important and useful to future different stakeholders such as for the researcher, Banks managers and executives and for other researchers. This study also will be important to banks' credit departments and senior managers as it will provide an insight into the image of banks' financial performance towards its credit management efficiency and how to reduce exposure to the risk.

The government will obtain information on the importance of implementation of various legal frameworks in relation to credit risk management, developing policy papers, policy making regarding credits and other regulatory requirements of commercial banks in Ethiopia.

The academicians will be furnished with relevant information regarding credit risk management and its effect on the financial performance of commercial banks. The study will contribute to the general knowledge and form a basis for further research.

1.5. Scope and Limitations of the paper

This research was limited to the impact of Credit risk Management on performance Commercial Banks in Ethiopia from 2005-2015. The study consists of only eleven years of data that might not be sufficient to establish the relation in a very significant manner. The study considers only secondary data but not primary (i.e., interaction with the executives in finance department would close picture and management style etc. is not considered). It also the finding of the study, analyses and recommendations do not represent the entire banking industry. The extension of the analysis to other banks may offer different results.

1.6. Organization of the paper

This study consists of five chapters. Chapter one presents introduction, statement of the problem, objective of the study, significance of the study and scope and limitations. Chapter two reviews the most significant theoretical and empirical studies. Chapter three presents methodology of the study. Then chapter four provides the result and discussion of econometric model outcomes and finally, chapter five gives conclusions and recommendations with policy implication and further research direction.

CHAPTER TWO
LITERATURE REVIEW

Introduction

This chapter deals with various concepts in regard to the relationship between credit risk management and performance of commercial banks. Theories about credit risk management and performance has been developed in this chapter. In addition the researcher has discuss various empirical studies, thoughts and ideas from different sources has been linked together to formulate a meaningful and magnificent material.

2.1. Theoretical Review

2.1.1. Credit risk in banking

According different author risk is defined as the possibility of suffering from harm or loss, danger. When we say risk in bank we mean that uncertainties that can make the banks to loose and be bankrupt. Credit in bank is a contractual agreement in which a borrower receives something of value now and agrees to repay the lender at some future agreed date. However Credit risk in bank is defined as the probability that some of a bank's assets, especially its loans, will decline in value and possibly become worthless. It arises from non-performance by a borrower, either an inability or unwillingness to repay the loan in the pre-committed contracted manner (Joan Selorm Tsorhe, 2010). Raghavan (2003) defined credit Risk is the potential that a bank borrower/counter party fails to meet the obligations on agreed terms. There is always scope for the borrower to default from his commitments for one or the other reason result a credit risk to the bank.

2.1.2. Risk and profitability

Risk is defined as the adverse impact on profitability of several different sources of uncertainty. As it was clearly explained before the main source of revenue or main sources of profit of banks came from the money they lend to their customers. Which means Risk-taking is an inherent element of banking and, indeed, profits are in part the reward for successful risk taking. In contrary, excessive risk taking and poorly managed risk can lead to distresses and failures of banks. Risk is, therefore, warranted when they are understandable, measurable, controllable and within a bank's capacity to withstand

adverse results (Guidelines for Commercial Banks & DFIs). Therefore, the financial condition of the borrower as well as the current value of any underlying collateral is of considerable interest to its bank (Anthony M. Santomero, 1997).

2.1.3. Credit Risk management in banking industry

Banks always earn profit from the difference between the interest rate they charges on borrowers and the interest rate they pays to depositors. Lending has always been the primary functions of any banking institutions, and accurately assessing a borrower's credit worthiness has always been the only method of lending successfully (Andrew Fight, 2004). To insure reasonable profit, banks attempt to make loans that will be fully repaid with interest on due date. Therefore, banks are directly concerned about borrowers repaying their loans on a timely basis so that the profit of the banks can be maximized.

If banks do not manage their credit risks effectively, they will not be profitable and will not be sustain in the business for very long time. Banks can reduce their exposure to credit risk on loans by applying major credit risk management principles (as identified by Fredrick S. Mishkin). These are:

1. Screening and monitoring: Adverse selections in loan market enable the lenders to differentiate between different borrowers who have different probabilities of repaying their loans. The bad credit from the good ones so that loans are profitable to them. Once a loan has been made, the bank's has to monitor or follow up the borrowers 'activities.
2. Long-term Customer Relationship: if the borrower has borrowed previously from the bank, the bank has easily got the loan repayments performance of the borrower from the past credit history. This reduces the costs of information collection and makes it easier to screen out bad credit risks. Long-term relationship enables banks to deal with even unanticipated moral hazard contingencies.
3. Collateral Requirements: is an important credit risk management tool. Collateral, which is property seized by the lender as compensation if the borrower defaults, it lesser the lender's losses in the case of a loan default.

4. Credit Rationing: is one way of credit risk management that refers refusing to make loans even if borrowers are offered to pay higher interest rate (Frederick S. Mishkin, 2004)

2.1.4. Impacts of credit risk management in bank

The objective of credit risk management to banking industry is to maximize a bank's risk-adjusted rate of return by maintaining credit risk exposure within acceptable parameters. Banks need to manage their credit risk inherent in the entire portfolio as well as the risk in individual credits or transactions. Banks should also consider the relationships between credit risk and other risks. The effective management of credit risk is a critical component of a comprehensive approach to risk management and is essential to the long-term success of any banking organization.

Banks and other financial institutions has given importance focus to the credit risk and considered as an essential factor in the financial sector that is needed to be managed. When banks recognized the credit risk, it means that there is a possibility that a borrower or counter party tends to fail in meeting the obligations in accordance with the agreed terms and condition. Credit risk in banks or any financial institution deals with lending to corporate, individuals, and other banks or financial institutions.

Credit risk management is a process that enables the banking industry to proactively manage the loan portfolios to minimize the losses and earn an acceptable level of return to its shareholders. The importance of the credit risk management is recognized by banks for it can establish the standards of process, segregation of duties and responsibilities such in policies and procedures endorsed by the banks (Focus Group, 2007).

2.1.5. Credit Risk Performance Measurement in Bank

The need to develop an efficient credit risk performance measurement is an important for the banking industry, since the nature of banking business is more sensitive to the credit risk. Credit risk performance measurement is very important in the industry of banking, in that if you would ask any person in the banking industry how important it is, he or she would tell you that this aspect has an impact on the overall success of the bank itself.

Thus, banks and other financial institutions, especially the ones that are involving in such business of lending, should pay high attention to this aspect.

Risks exist in any aspect of business activity. Especially in the banking industry, you could safely say that these institutions deal with risks every single working day. Moreover, just about all of these risks are financial in nature. Thus, there is a need to balance risks and returns of investments altogether.

The banking business of today has get large market share, by collecting a large customer base, through offering a lot of reasonable loan products. This loan product would be offered at low interest rates. This is obtained by pegging interest rates that are too low would also incur losses for the bank. After all, banks should have substantial capital in terms of reserves. There should be balance to this, actually. If a bank has too much capital in its reserves, then there is that risk that the bank might miss out on its investment revenue. On the other hand, if a bank has too little capital to begin with, this would only lead to financial instability. Moreover, there is also that risk of regulatory non-compliance that the bank would have to deal with as well. Striking a balance is then very important here. By financial definition, credit risk management pertains to that process of assessing the risks that come with any investment. For the most part, risk comes in the form of investments and the allocation of capital. These risks should be assessed so that a reliable and sound investment decision would have been achieved. Risk assessment is also an important factor to consider when you are aiming for a certain position in balancing risks and returns.

Banks frequently have to deal with the risk of a client defaulting payment of their loan. This is one risk that banks would have to expect, however unfortunate the case may be. This would have just one of the many risks that banks have to deal with each day. Thus, it is only logical for banks to keep a substantial portion of its capital in its reserves so as to maintain economic stability and protect its own solvency.

The determination of the risks involved here entails several practices. For starters, banks need to come up with certain estimates as to the figures to keep and the ones to make available for loans. Also, banks have to monitor the performance of the bank, as well as

evaluate it. Always remember that portfolio analyses and loan reviews are a must when it comes to efficient credit risk performance measurement (banking performance measurement, 2000).

2.1.6. Relationship between credit risk management and bank performance

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 can lead to a 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, et al, 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 as well as the economic growth of any country. It becomes more and more significant in order to ensure sustainable profits in banks.

2.1.7. The theory of Structure Conduct Performance (SCP) Hypothesis

In formulation of theoretical framework for studying the impact of credit risk management on performance of commercial banks in Ethiopia (industry –specific factors), market structure conduct performance hypothesis provided use full model. Market structure conduct and performance (SCP) framework derived from the neo classical analysis of markets. It first formalized by Mason in 1939 as a method of analyzing markets and firms (Worthington et al., 2001). The SCP was the central opinion of the Harvard school of thought and popularized during 1940-60 with its empirical work involving the identification of correlations between industry structure and profitability. Most early research explanation for the relationship between the market concentration

and profitability based on the structure-conduct performance (SCP) hypothesis, and focused on the interpretation of a positive empirical relationship between concentration and profitability Goddard et al. (2004).

The SCP paradigm asserts that there is a relationship between the degree of market concentration and the degree of competition among firms. This hypothesis assumes that firms behave or rivalry in the market determined by market structure conditions, especially the number and size distribution of firms in the industry and the conditions of entry. This rivalry leads to unique levels of prices, profits and other aspects of market performance (Berger et al., 1989). The Structure-Conduct-Performance (SCP) hypothesis, which also sometimes referred to as the MP hypothesis, asserts that increased market power yields monopoly profits. A special case of the SCP hypothesis is the Relative-Market-Power (RMP) hypothesis, which suggests that only firms with large market shares and well-differentiated products are able to exercise market power and earn non-competitive profits (Berger, 1995).

The assumptions of SCP hypotheses have been applied in different research by various researcher and supported positive relationship between market concentration (measured by concentration ratio) and performance (measured by profits) exists. Furthermore, SCP recognized the competitiveness of small market share banks with large market share is weak as a result the positive relationship between market concentration and performance (profitability) of high market share banks exist (Berger and Hannan, 1989). As explained in the SCP, the market concentration encourages collusion among large firms in the industry, which subsequently leads to higher profits. Hence, SCP pointed out those changes in market concentration may have a direct influence on a firm's financial performance. Firms in more concentrated industries can earn higher profit than firms operating in less concentrated industries earn, irrespective of their efficiency (Goldberg et al., 1996).

The relative market power hypothesis (RMPH) which is a special case of SCP posited that only banks with large market shares and well differentiated service lines are able to exercise market power to gain superior profit on non-competitive price setting behavior (

in this case service charge) Berger (1995). Studies, such as those by Smirlock (1985) and Berger and Hannan (1989), investigated the profit-structure relationship in banking, providing tests of the RMP hypotheses. To some extent, the RMP hypothesis verified that superior management and increased market share (especially in the case of small-to medium-sized banks) raise profits. SCP, in general, provides two main benefits to studies, which investigate the banks profit behavior. First, it shows the way to the banks' profits are operating. Thus, it explains different forces that restrict or expand the scope of banks' operations in the market. Especially with profitability studies, SCP helps to interpret different sources of productivity and efficiency gains or losses. Second, SCP provides a rational basis for analyzing the market behavior.

2.2.   Empirical Literature

This section gives a brief review of the previous studies made on the impact of credit risk management on performance commercial banks. The empirical works done on the impact of credit risk management on banks performance was from both developed and developing countries. The study paper in banking profitability, Haslem (1968) identifies that bank management, time, location and size influence on bank's profitability. It remains a great interest among the researchers to investigate the effect of credit risk on profitability. For example, Berger (1995) surprisingly finds a strong positive relationship between capital adequacy ratio and profitability of US banks during1980s however, he considered the relationship should be negative under certain situations. In another study Kosmidou et al. (2005) also finds the similar result for UK commercial banks during 2000-2005. Moreover, many studies also devote to investigate the relationship. Hosna et al. (2009) find a positive relationship between credit risk and profitability on four commercial banks in Sweden during 2000 to 2008. However, in another study Kithinji (2010) investigates the impact on profitability of credit risk on the Kenyan commercial banks but finds a neutral effect of credit risk on profitability. In addition, Kolapoet al. (2012) also found a negative relationship between credit risk and the profitability on 5 Nigerian commercial banks over 2000-2010.   In another study, Ruziqa (2013) investigates the joint effect of credit risk and liquidity risk on the profitability of large banks of Indonesia and finds negative effect of credit risk and positive effect of liquidity risk on the profitability.

Similarly, Felix and Claudine (2008) investigated on the relationship between the performance of banks and credit risk management. In their finding, they observed that return on equity and return on assets both measuring the bank profitability were inversely related to the ratio of non-performing loan to total loan of financial institutions thereby leading to a decline in profitability. Kargi (2011) evaluated the impact of credit risk on the profitability of Nigerian banks. The study used secondary data for analysis and was collected from the annual reports and accounts of sampled banks from 2004-2008 and analyzed using descriptive, correlation and regression techniques. Findings from the study revealed that credit risk management has a significant impact on the profitability of Nigerian banks. Hence, they concluded that banks' profitability is inversely influenced by the levels of loans and advances, non-performing loans and deposits thereby exposing them to great risk of illiquidity and distress.

Sujeewa (2015) examined the impact of credit risk management on the performance of commercial banks in Sri Lanka. The objective of the study was to identify the impact of credit risk management on the performance of the commercial banks in Sri Lanka. The panel data of a five year period from 2009 to 2013 from the selected banks were used to examine the relationship between credit risk and performances. The Return on Assets (ROA) is used as performance indicator and Loan provision to Total (LP/TL), Loan Provision to Non-Performing Loans (LP/NPL), Loan Provision to Total Assets (LP/TA) and Non-Performing Loans/ Total Loans (NPL/TL) were used as indicators of credit risk. Further, a regression model was used to establish the relationship between amounts of loan as well as non-performing loans and profitability during the period of study by using E-views software. The result shows that non-performing loans and provisions have an adverse impact on the profitability. Poudel et al,(2012) in his study on the impact of credit risk management on financial performance of commercial banks in Nepal, he found that default rate, cost per loan assets and capital adequacy ratio have an inverse impact on banks' financial performance; however, the default rate is the most predictor of bank financial performance.

Further study conducted by Idowu and Awoyemi (2014) assessed the impact of credit risk management on the commercial banks performance in Nigeria. Financial reports of

seven commercial banking firms were used to analyze for seven years (2005 – 2011). The panel regression model was employed for the estimation of the model. In the model, Return on Equity (ROE) and Return on Asset (ROA) were used as the performance indicators while Non-Performing Loans (NPL) and Capital Adequacy Ratio (CAR) as credit risk management indicators. The findings revealed that credit risk management has a significant impact on the profitability of commercial banks' in Nigeria.

The research title on the impact of overall risk management in Sri Lankan banks' performance by Fernando and Nimal (2013) analyzed the impact of overall risk management on Sri Lankan banks' performance. The main objective of the study was to identify the impact of risk management on bank efficiency in Sri Lankan Banks. The study adopted Second Stage Data Development Analysis based on the data for the period from 2005 to 2011 of Licensed Domestic Commercial Banks in Sri Lanka. In the second stage it applied Tobin Regression to find the influence of external environmental factors on bank efficiency. The mean efficiency of Sri Lankan banks is high compared to the other well improved countries such as India, UK, and USA. Taiwan and Islamic Banks located in London. Further, the study found that the risk management programs have improved the efficiency of the Licensed Commercial Banks in Sri Lanka.

Ahmad and Ariff (2007) examined the key determinants of credit risk of commercial banks on emerging economy banking systems compared with the developed economies. The study found that regulation is important for banking systems that offer multi-products and services; management quality is critical in the cases of loan-dominant banks in emerging economies. An increase in loan loss provision is also considered to be a significant determinant of potential credit risk. The study further highlighted that credit risk in emerging economy banks is higher than that in developed economies.

Ahmed, et al. (1998) in their study also found that loan loss provision has a significant positive influence on non-performing loans. Therefore, an increase in loan loss provision indicates an increase in credit risk and deterioration in the quality of loans consequently affecting bank performance adversely. In addition, Al-Khouri (2011) analyzed the impact of bank's specific risk characteristics, and the overall banking environment on the

performance of 43 commercial banks operating in 6 of the Gulf Cooperation Council (GCC) countries over the period 1998-2008. Using fixed effect regression analysis, results showed that credit risk, liquidity risk and capital risk are the major factors that affect bank performance when profitability is measured by return on assets while the only risk that affects profitability when measured by return on equity is liquidity risk. Ben-Naceur and Omran (2008) in attempt to examine the influence of bank regulations, concentration, financial and institutional development on commercial banks' margin and profitability in Middle East and North Africa (MENA) countries from 1989-2005 found that bank capitalization and credit risk have positive and significant impact on banks' net interest margin, cost efficiency and profitability.

The study conducted by Khrawish (2011) accessed the Jordanian commercial bank profitability from 2000through 2010 and categorized the factors affecting profitability into internal and external factors. the author found that there is significant and positive relationship between return on asset (ROA) and the bank size, total liabilities/ total assets, total equity/ total assets, net interest margin and exchange rate of the commercial banks and that there is significant and negative relationship between ROA of the commercial banks and annual growth rate for gross domestic product and inflation rate. Dietrich and Wanzenrid (2009) analyzed the profitability of commercial banks in Switzerland over the period 1999 to 2006. Their findings revealed that the most important factors are the GDP growth variable, which affects the bank profitability positively, and the effective tax rate and the market concentration rate, which both have a significantly negative impact on bank profitability.

Macit (2011) investigated the bank specific and macroeconomic determinants of profitability in participation banks for Turkish banking sector using ROA and ROE. He found that for the bank specific determinants of profitability, the ratio of non-performing loans to total loans has a significant negative effect on profitability. The result is consistent with the study by Davydenko (2010) in the Ukraine. Riaz (2013) investigated the impact of the bank specific variables and macroeconomic indicators on the profitability of banks in Pakistan during the period of 2006- 2010. When ROA is taken as

a dependent variable, he determined that the credit risk as well as the interest rate has a significant influence on the commercial banks' profitability in Pakistan.

Muasya (2009) analyzed the impact of non- performing loans on the performance of the banking sector in Kenya in the time of global financial crises. The findings confirmed that non- performing loans do affect commercial banks in Kenya. Wanjira (2010) studied the relationship between non- performing loans management practices and financial performance of commercial banks in Kenya. The study concluded that there is a need for commercial banks to adopt non-performing loans management practices. The study further concluded that there was a positive relationship between non- performing loans management practices and the financial performance of commercial banks in Kenya which implies that the adoption of non- performing loans management practices leads to improved financial performance of commercial banks in Kenya.

Muthee (2010) conducted a research on the relationship between credit risk management and profitability in commercial banks in Kenya. The findings and analysis revealed that credit risk management has an effect on profitability in all the commercial banks analyzed. The study used regression analysis to establish the relationship between NPLR and ROE. A forecasting model was developed and tested for accuracy in obtaining predictions. The finding of the study indicated that the model was moderately significant.

Liu and Wilson (2009) investigated on profitability of banks in Japan following the mid-1990s financial crisis. These authors used dynamic model and study variables were diversification, loans to assets, capital to assets, cost to income, market share, industry concentration, percentage of market capitalization of listed companies over GDP, real GDP growth and the ratio of impaired loans to gross loans granted. Findings showed that well capitalized, efficient banks with lower credit risk tend to outperform less capitalized, less efficient banks with higher credit risk. The study also indicated that industry concentration, GDP growth and stock market development influences bank profitability.

A study was conducted by Krakah and Ameyaw (2010) examined on determinants of bank's profitability in Ghana a case study research design on Ghana commercial bank Ltd and Merchant bank Ltd. Their study covered from 1990 to 2009 and they used a

combination of ratio analysis and the least square regression model. Results revealed that banks' performance has been highly volatile and that non-interest income, non-interest expenses, size, bank's capital strength, growth in money supply and inflation are significant determinants of banks' profitability in Ghana. Madishetti and Rwechungura (2013) analyzed Tunisian bank using multiple regression model and the study covered from 2006 to 2012. Study variables were liquidity risk, operational efficiency, credit risk, business mix, bank assets, annual GDP growth rate, capital adequacy and annual inflation rate. Findings indicated that capital adequacy, bank size, liquidity risk, operational efficiency and credit risk influence bank profitability. GDP and inflation were not determinants of banks 'profitability in Tanzanian commercial banks.

In Ethiopia, the related titles were studied by Mekesha &Tefera (2011) both of them are studied on the effect of credit risk management on the performance of commercial banks in Ethiopia. Their conclusion showed that there is a negative relationship between credit risk and performance of commercial banks in Ethiopia. On the contrary, the research conducted by Million (2014) shows the significant positive relationship between Loan loss provision and commercial banks performance on this study might indicates the presence of potential earning management activities by bank managers. Belayneh (2011) on the determinants of commercial banks profitability during the period 2001 – 2010 by using Ordinary Least Square (OLS) and balanced panel data of seven Ethiopian commercial banks. The result from estimation shows that, capital can significantly affect commercial banks profitability in Ethiopia. Following this, he concluded that there is positive relationship between banks capital and profitability. And also the higher the capital level brings higher profitability for Ethiopian commercial banks since by having more capital; a bank can easily adhere to regulatory capital standards and the excess capital also can be provided as loans.

Tesfaye (2014) with the title of the Determinants of Ethiopian Commercial Banks Performance investigates the determinants of Ethiopian banks performance considering bank specific and external variables on selected banks' profitability for the 1990-2012 periods. The study finds that bank specific variables by large explain the variation in profitability. Macro-economic variables such real GDP growth rates have no significant

impact on banks' profitability. However, the inflation rate is determined to be significant driver to the performance of the Ethiopian commercial banks. Other study by Kokobe no date with title Determinants of financial performance of commercial banks in Ethiopia examines the determinants of financial performance of commercial banks in Ethiopia over the period 2002-2013. Based on the regression result, all bank specific, industry specific and macro-economic variables affect performance of the bank significantly and except inflation which was insignificant and positive for the performance measured by ROA. Furthermore, all variables have significant effect on the performance of banks when performance is measured using NIM.

Though different studies are conducted on the impact of credit risk management on banks performance, their result is not conclusive as far as the impacts of the factors are concerned. This implies that, there is no consensus in the banking literature regarding on the impact of credit risk management on bank performance.

Additionally, as per the researcher knowledge most of the study conducted in Ethiopia on this title consider the bank specific(internal) factors, only few study has been conducted by considering the bank specific, Industry specific and macroeconomics specific factors to measure bank's performance. Therefore, this study aims to fill the gap in the literature by focusing on bank specific, Industry specific and macroeconomics specific factors impact of credit risk management on the performance of commercial banks in Ethiopia.

CHAPTER THREE
RESEARCH METHODOLOGIES

This chapter discusses the methodology of researches that the researcher employed in carrying out the research. This is to enable good understanding of what methodology is all about. Jankowicz (1991), defines methodology in respect to research as 'the analysis of, and rational for, the particular method or methods used in general". Given the above definition, we can simply say methodology of the study is all about the procedures employed in carrying out the research. This chapter explains the research design, source and methods of data collection, methods of data analysis, model specification and definition variable and measurement.

3.1. Research design

The objective of this research is to investigate the impact of credit risk management on performance of Commercial Banks in Ethiopia. To analyze in this study, the researcher adopted descriptive research method analysis. The descriptive method of research is to gather information about the present existing condition. The emphasis was on describing rather than on judging or interpreting. The descriptive approach was quick and practical in terms of the financial aspect.

In this study the researcher used Quantitative research approaches, because Quantitative approach in which the problem is: identifying factors that influence an outcomes: the utility of an intervention, understanding the best predictors of outcomes and testing theory or explanation.

3.2. Study population and sampling technique

The target population is described universal set of study of all members of people, events or objects to which an investigator generalized the result. The target population of this study was seventeen commercial banks in Ethiopia which were: Commercial Bank of Ethiopia, Dashin Bank, Awash International Bank, Bank of Abyssinia, Wegagen Bank, United Bank, Lion International Bank, Cooperative Bank of Oromia, Nib International Bank, Zemen Bank, Oromia International Bank, Bunna International Bank, Birhan

International Bank, Abay Bank, Addis International Bank, Debub Global Bank and Enat Bank. From these eight banks namely Commercial Bank of Ethiopia, Dashin Bank, Awash International Bank, Wegagen Bank, United Bank, NIB International Bank, Bank of Absiniya and Cooperative Bank of Oromia would be selected by using purposive sampling technique. The analysis covered eleven years period from 2005-2015. The result obtained from this selected banks in the study can be a representative for all the other banks which are working in the industry. The purposive sampling technique the researcher would use based on the historical formation time of banks and existence available of data.

3.3. Sources and method of data collection

The study analyzed the impact of credit risk management on the performance commercial banks in Ethiopia. The study covered from 2005-2015 and analyzed a panel data of Eight (8) selected commercial banks. The study used data from secondary sources of selected banks. The major data sources were the various annual publications of the NBE, MoFED and selected commercial banks in the industry.

3.4. Method of data analysis

In analyzing the impact of credit risk management on the performance commercial banks in Ethiopia the researcher used the following method of analysis.

After the data had collected, the researcher used software to analyze the raw data. Therefore, the researcher chose Stata 12 econometric software for data analysis. The researcher imported the data to Stata12 econometric software and run regression and descriptive analyses. Two kinds of statistical techniques were used for this study. These techniques were descriptive statistics and regression analysis

Descriptive statistics: The study contains mean, standard deviation, maximum and minimum as descriptive statistics. They are useful because it explains the main features of data, distribution of tendency and dispersion of each variable and present relationship between variables with correlation results. It is also good way to summaries the data.

Additionally, descriptive statistics explains analyses the impact of credit risk management on the performance commercial banks in Ethiopia.

Regression Analysis: is statistical tool to investigate relationships between the variable (Scarbrough &Tanenbaum, 1998). It was used for this study because researcher wants to explain, identify and quantify relationships between variables (if any) in detail. It also provides estimations of quantitative effect of variables and assesses the statistical significance of the estimated relationships.

In this study the panel data methodology was adopted. The nature of data collected determines the type of tool to be adopted for analysis.

Panel Data Regression Analysis: This type of regression analysis that involves panel data analytical technique. Panel data are said to repeat observations on same cross section. Typically of individual variables that are observed for several times (Pesaran, Shin and Smith, 2000; Wooldridge, 2003; Baum, 2006 in Westham, 2009).

3.5. Model Specification

The study adopted a quantitative approach to examining the bank specific, industry specific and macro variable specific factors impact of credit risk management on commercial banks performance in Ethiopia. The research analysis was considered return on assets (ROA) as performance (profitability) measures. Multiple linear regression analysis was captures existence of simultaneous relationships between dependent and independent variables and worked best in identifying effects that each explanatory variable has on each of the performance (profitability) measures. For the purpose of analysis the study was apply similar model applied by Li (2007), Ayele (2012) and Madishetti et *al,* (2013). Stata 12 econometric software was used for data analysis. The multiple linear regression models were as follows:

$$Y_{i,t} = \alpha + \beta X_{i,t} + \mu_{i,t}$$

Where:

$Y_{i,t}$ = is the dependent variable.

α= is the intercept

$X_{i,t}$ = is the independent variable.

$\boldsymbol{\mu_{i,t}}$=are the error terms.

i =denote the cross-section

t= representing the time-series dimension.

Therefore the general models which incorporate all of the variables to test the hypotheses of the study will:

$$ROA_{i,t} = \alpha + \beta_1 NPLR_{i,t} + \beta_2 DGR_{i,t} + \beta_3 IND_{i,t} + \beta_4 BS_{i,t} + \beta_5 CON_{i,t} + \beta_6 IS_t$$
$$+ \beta_7 GDP_t + \beta_8 INF_t + U_{i,t}$$

Where;

$\boldsymbol{ROA_{i,t}}$ = is the Return on Asset of ith bank at year t

$\boldsymbol{NPLR_{i,t}}$ = is Nonperforming loan ratio of ith bank at year t

$\boldsymbol{DGR_{i,t}}$= is Deposit growth of ith bank at year t

$\boldsymbol{IND_{i,t}}$= is Diversification of ith bank at year t

$\boldsymbol{BS_{i,t}}$= is the Bank size of ith bank at year t

$\boldsymbol{CON_{i,t}}$= is the Industry concentration of banks at year t

$\boldsymbol{IS_t}$= is the average Interest rate Spread of banks at year t

$\boldsymbol{GDP_t}$= is Gross Domestic product growth of the country at year t

$\boldsymbol{INF_t}$= is inflation growth of the country at year t

$\boldsymbol{U_{i,t}}$=are the error terms

Finally, regression results have been presented in a tabular form with the appropriate test statistics and then an explanation of each parameter has given in line with the evidence in the literatures.

Furthermore, various diagnostic tests such as normality, heteroscedasticity and multicolinearity test have been conducted to decide whether the model used in the study was appropriate and fulfill the assumption of classical linear regression model.

3.6. Study Variables

Profitability was dependent variables used in this study. It is measured in terms of ROA. In addition, explanatory variables included in this study are NPLR, bank size, income diversification and deposit growth rate are those from the bank specific factors, industry

concentration from industry specific factors and Interest Spread, GDP growth and inflation rate were from the macroeconomic factors.

3.6.1 Dependent variable

Bank Performance Indicators

Profit is the ultimate goal of commercial banks. All the strategies designed and activities performed are meant to realize this grand objective. However, this does not mean that commercial banks have no other goals. Commercial banks could also have additional social and economic goals. However, the intention of this study was related to the first objective, profitability. To measure the profitability of commercial banks there are variety of ratios used of which Return on Asset, Return on Equity and Net Interest Margin are the major ones (Murthy and Sree, 2003; Alexandru et al., 2008).

Bank profitability may reflect the risk taking behavior of banking. Banks with high profitability are less over stressed for revenue making and thus less forced to engage in risky credit offering. However, inefficient banks are more likely to experience high level of problem loans since they are tempted to grant and to engage in more uncertain credits to defend their profitability and meet the prudential rules imposed by monetary authorities (Boudriga et al. 2009). Poor management can imply week monitoring for both operating cost and credit quality of customers, which will include high levels of capital losses (Haneef et al. 2012). Thus, ROA will be considered as profitability indicators of bank in this study.

Measurement of Bank Performance

The efficiency of the banking sectors has been one of the major focuses in the new monetary and financial environment. Their efficiency and competitiveness cannot easily be measured, since their products and services are of an intangible nature. Many researchers have attempted to measure the productivity and efficiency of the banking industry using outputs, costs, efficiency and performance.

In many of the literature reviewed its explained that bank performance is represented mainly by quantifiable financial indicators. The literature on the determinants of bank

performance has closely tied bank performance with profitability measures such as ROA, ROE and NIM. However, this study objective was to measure the bank performance returns on asset (ROA).

Return on assets (ROA)

The ratio reflects bank's earnings ability and is calculated by dividing net income by total assets. Return on assets explains the relationship between generated net income and bank assets by indicating profit earned per dollar of assets (Javaid et al, 2011). The ratio reflects the efficiency of bank's management in using their assets to generate profit (Dzingirai and Katuka, 2014). Higher ratio would mean greater efficiency in converting bank assets into net income and low ratios signal less efficiency by banks in converting assets into net income. (Athanasoglou et al, 2005) and Li (2007) incorporated ROA variable in their previous studies.

3.6.2. Independent variables

Bank-specific variables

Analysis on bank specific factors includes; non-performing loan ratio, bank size, bank diversification and deposits growth rate.

Nonperforming loan ratio (NPLR)

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.

The issue of non-performing loans (NPLs) has gained increasing attentions in the last few decades. Large amount of NPLs in the banking system has led to banking failure. Many researches on the cause of bank failures find that asset quality is a statistically significant predictor of insolvency (e.g. Dermirgue-Kunt 1989, Barr and Siems 1994), and that failing banking institutions always have high level of non-performing loans prior to failure.

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.

Deterioration in asset quality, especially loan is much more serious problem of bank unless the mechanism exists to ensure the timely recognition of the problem. It is a common cause of bank failure. Poor asset quality leads nonperforming loan that can seriously damage a banks' financial position having an adverse effect on banks operation (Lafunte, 2012). It distresses the performance and survival of banks (Mileris, 2012). It is measured or indicated by the amount of NPLs to Total Loan.

Deposits growth rate (DGR)

Deposits growth rate is measured by dividing current year's deposits by previous year's deposits minus one. The expected sign is uncertain due to variety of reasons. Dietrich (2009) indicated that effect of deposits on performance depends on bank's ability to convert them into income. If deposits are extended as good loans, they could positively influence profitability. If they are extended as bad loans, they could bring negative effects on performance (Jabbar, 2014).

Diversification (IND)

This ratio is computed as the percentage of the bank's non-interest income over its total income. This ratio is included because it reflects how well the bank has diversified its source of income. A high ratio of this would mean that the bank is performing better in terms of diversifying its activities to boost its income and thereby affect the profitability of the bank favorably. Thus, the variable is expected to have positive relationship with bank profitability.

Bank Size (BS)

Bank size is measured by the natural logarithm of total bank assets. This variable will capture existence of economies of scale or diseconomies of bank size. The bedrock

assumption is that large banks are more profitable than small banks due to their ability to diversify and reduce risk. Increase in bank size is expected to be accompanied by rise in profitability but if size becomes extremely big, it could bring negative effects on bank performance (Athanasoglou et al, 2005).

Boyd and Runkle (1993) established a significant inverse relationship between size and return on assets in U.S banks from 1971 to 1990 and positive relationship between financial leverage and size of banks. (Berger, 1987) showed that banks experience some diseconomies of scale to negatively affect performance. (Goddard et al, 2004), on five European countries, observed that the growth in bank size could positively influence bank performance. This study expectation of the impact of bank size on bank performance (ROA) could be either negative or positive.

Industry specific factors

Industry concentration (CON)

The banking industry structure, in terms of concentration, affects banks' performance as individual entities. Banking structure and concentration communicates competition intensity among the banking industry and this will be captured by dividing the ratio of three largest banks' assets to the total assets of the entire banking industry (Dietrich *and* Wanzenried, 2009; Sufian, 2011; Naceur, 2003). SCP maintains that banks in highly concentrated markets tend to collude and generate above-normal profits, this hypothesis suggest a positive relationship between concentration and performance (profitability). However Boone and Weignand (2000) indicated that if high concentration is a result of tougher competition in the banking industry, there would be a negative association between the two. In this regard the researcher is uncertain on the expected association between banking industry concentration and bank profitability; it could be either negative or positive.

Macroeconomic determinant variables

Interest Rate Spread (IS)

Interest rate spreads arise out of the core functions of financial institutions most especially the commercial banks which include lending and deposits taking. As banks

lend, they charge interest and for attracting deposits, they offer interest on deposit as compensation for their clients' thriftiness and the difference between the two rates forms the spread (Hamis, 2010).

The theoretical model of Ho and Saunders (1981) expanded by Angbazo (1997) and Maudos and Guevara (2004) indicate that there is a positive correlation between credit risk or loan quality and interest rate spreads. The model argues in part that when banks are faced by deterioration in loan quality (credit risk), they hedge against the impending loss by transferring a portion or all of it to their customers (either borrowers or depositors). This is done by increasing the lending rate and or lowering the deposit rate.

Interest spread is the difference between the average lending rate and the average borrowing rate for a bank or other financial institution. It is:
IS= (interest income ÷interest earning assets) - (interest expense ÷interest bearing liabilities)

This is very similar to interest margin. If a bank's lending was exactly equal to its borrowings (i.e. deposits plus other borrowing) the two numbers would be identical. In reality, bank also has its shareholder's funds available to lend, but at the same time its lending is constrained by reserve requirements.

GDP growth (GDP)

The impact of macroeconomic variables on bank performance has recently been highlighted in the literature. GDP growth is adopted as a control for cyclical output effects, and expected to have a positive influence on bank profitability. As GDP growth slows down, and, in particular, during recessions, credit quality deteriorates, and defaults increase, thus resulting into reduced bank returns.

Demirgüç-Kunt and Huizinga (1998), and Bikker and Hu (2002) discovered a positive correlation between bank profitability and the business cycle. By employing a direct measure of business cycle, (Athanasoglou et al, 2005) have found a positive, notwithstanding asymmetric, effect on bank profitability in the Greek banking industry, with the cyclical output being significant only in the upper phase of the cycle. Al-

Haschimi (2007) further established that the macroeconomic environment has only limited effect on net interest margins in SSA countries. This evidence is consistent with the results of other country-specific studies (Chirwa and Mlachila (2004) for Malawi, and Beck and Hesse (2006) for Uganda). Therefore this study expected GDP growth will have positive impact on bank profitability.

Inflation growth (INF)

The other macroeconomic credit risk factor is also by controlling for inflation. It predicted by the extent to which inflation affects bank profitability depends on whether future movements in inflation are fully anticipated, which, in turn, depends on the ability of firms to accurately forecast future movements in the relevant control variables. An inflation rate that is fully anticipated increases profits as banks can appropriately adjust interest rates in order to increase revenues, while an unexpected change could raise costs due to imperfect interest rate adjustment.

Other studies, by Bourke (1989), Molyneux and Thornton (1992), Demirgüç-Kunt and Huizinga (1998), have found a positive relation between inflation and long term interest rates with bank performance. Inflation rate is approximated by the previous period's actual inflation and could positively or negatively influence bank profitability, positive due to the ability of bank management to satisfactorily, though not fully forecast the future inflation, which in turn could be incorporated into interest rate margins to achieve higher profits. Therefore in this study the expected impact of this macro variable will be either negative or positive.

Expected Sign

Expected sign was a statistical technique which shows the relationship between two variables. The positive expected sign means that one variable increase, the other variable will also increase while negative expected sign means that when one variable increase, the other variable will be decrease.

Table 3.1 Summary of explanatory variables and their expected effect on the dependent variables

Non- performing loan Ratio	NPLR: the percentage of non-performing loans over Total Loan	Negative
Deposit growth rate	DGR: calculated by dividing current year's deposits by previous year's deposits minus one	Negative/Positive
Diversification	IDN: the ratio of non -interest income to total income	Positive
Bank size	BS: natural logarithm of total assets of the bank	Negative/Positive
Industry concentration	CON: the ratio of three largest banks' assets to the total assets of the entire banking industry	Negative/Positive
Interest rate spread	IS: the difference between interest rate on annual average loans/Lending rate and interest rate on deposits/Deposit rate)	Positive
GDP growth	GDP: growth rate of real gross domestic product	Positive
Inflation growth	INF: annual general inflation rate	Negative/Positive

CHAPTER FOUR

RESULT AND DISCUSSION

This chapter presents the researcher main findings of the impact of credit risk management on the performance of Commercial Banks in Ethiopia as well as the analysis and discussion of the results in comparison to the theories and earlier empirical results discussed and presented in previous chapters by using specification and misspecifications classical linear assumption and model specifications. The researcher start by investigating the main credit risk factors such as bank specific, industry specific and macroeconomics specific factors over study period as independent variables and the performance level as a dependent variable. It also presents the results of panel data regression analysis results, data were taken from the annual report of the NBE, MoFED and the sampled commercial banks in the industry.

4.1. Specification and misspecification classical linear assumption

4.1.1. Descriptive statistics

This section presents the descriptive statistics of dependent and independent variables used in the study for the sampled banks. The researcher used Stata version 12, software for the analysis method in this study. The dependent variable used in the study was ROA while the independent variables were non-performing loan ratio, deposit growth rate, income diversification, bank size, industry concentration, interest rate spread, Growth domestic product and inflation rate during the period 2005-2015 for Ethiopian Commercial Bank's. Descriptive statistics showing mean, standard deviation, and a minimum and maximum value of Ethiopian Commercial Bank's indicated below.

Table 4.1 *Descriptive statistics*

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	88	.0286136	.0115624	-.024	.058
NPLR	88	.0370114	.0321231	.003	.212
DGR	88	.3699886	.6062949	-.032	5.533
IND	88	.3975227	.1049526	.033	.614
IS	88	.0836364	.003595	.081	.092
GDP	88	.1072727	.0103199	.088	.126
INF	88	.1621818	.1082703	.028	.364
CON	88	.0984091	.1652398	.002	.678
BS	88	8.918216	1.369826	4.86	12.624

* Source: Stata data output result computed from Annual report of Ethiopian Commercial Bank's, NBE and MoFED.

As it can be seen from the above Table 4.1, the ROA measured by the net income divided by total asset has a mean value of 2.86 percent (mean= 0.029). This indicates that the sample banks on average earned a net income of 0.029 cents of net income for a single birr invested in the total assets which is unsatisfactory return. The maximum value of ROA was 0.058 and minimum value of -0.024. That means the most profitable bank among the sampled banks earned 0.058 cents of net income for a single birr invested in the assets of the firm. On the other hand, the least profitable bank of the sampled banks incurred -0.024 cents of loss for each birr investment in the assets of the firm. The standard deviation is 1.2 percent (mean=0.012) from the average value, which reflects the presence of small variation across the sampled commercial banks.

Regarding the independent variables, non-performing loan ratio which was measured by the ratio of total non-performing loan over total loan and advances has a mean value of 3.7 percent (mean=0.037) with a maximum and minimum value of 21 and 0.3 percent respectively. In addition, the standard deviation of the non-performing loan ratio was 3.2 percent which implies the presence of moderate variations among the values of non-performing loan ratio across the sampled commercial banks included for this study. The deposit growth rate of the sampled Ethiopian commercial banks on average were 37

percent (mean= 0.37) as measured by annual change of total deposit. The maximum and the minimum value of annual change of total deposit were 5.53 and -0.032 respectively with standard deviation of 60.63 percent. It showed DGR has higher standard deviation implying greater variability in deposits growth rate among the sampled Ethiopian commercial banks over the study period.

The other independent variable used in the study was the income diversification which is measured by non-interest income divided by total income has a mean value of 39.75 percent with a standard deviation of 10.5 percent including the maximum and minimum value of 61.4 and 3.3 percent respectively. This shows that in the study period the sample commercial banks have higher variation in diversification of their source of income. The mean of 39.75 percent, indicate, most banks from the sample earn 39.75 cents as non-interest income from one birr income. The maximum value (61.4 %) indicated some banks from the industry use non-interest income as the main source of income rather than interest income. This indicates, those banks have gradually transforming away from the traditional business of financial intermediation towards provision of other financial services like money transfer. The minimum value (3.3%) indicates the more traditional banks in the industry still use interest income as the main source of income.

On the other hand, the bank size which is measured by logarithm of total asset has mean value of 8.92 and standard deviation of 1.37. The maximum and minimum value of bank size of commercial banks in Ethiopia over the study period was 12.62 and 4.86 respectively. This indicates the bank size has the highest mean, standard deviation, maximum and minimum value among from other explanatory variables over the study period. This implies over the study period there is high variation of the bank size among the sampled commercial banks in Ethiopia.

The other important variables used in the study was industry concentration which was measured by the ratio of three largest banks' assets to the total assets of the entire banking industry have a mean value of 9.8 percent with a standard deviation of 16.5 percent including the maximum and minimum value of 67.8 and 0.2 percent respectively. It indicates that industry concentration have higher standard deviation which

implies that there were significant variations on asset concentration among the sampled Ethiopian commercial banks over the study period.

Regarding the external variables, real GDP growth, inflation rate and interest rate spread have a mean value of 10.73, 16.22 and 8.36 percent respectively. Among the external variables the inflation rate has higher mean value with higher standard deviation of 10.83 percent. This indicates higher variability and this reveals that inflation in Ethiopia was not stable during the study period.

4.1.2. Pearson correlation matrix

Correlation test is common carrying out in research that relate with regression was determine whether collinearity exist among the independent variable employed in the work or not, because it is capable of distorting the true picture of the relationship of dependent variable and independent variable. The most widely-used type of correlation coefficient is Pearson r, also called linear or product moment correlation.

According to Brooks (2008), if it is stated that y and x are correlated, it means that y and x are being treated in completely symmetrical way. Thus, it is not implied that changes in x cause changes in y or indeed that changes in y cause change in x rather, it is simply stated that there is evidence for a linear relationship between the two variables, and that movements in the two are on average related to an extent given by the correlation coefficient. Correlation coefficient between two variables ranges from +1, (i.e. perfect positive relationship) to (i.e. perfect negative relationship). It also defined as dependence of one variable upon another. Based on the Pearson correlation independent variables; non-performing loan ratio, deposit growth rate, income diversification, bank size, industry concentration, interest rate spread, growth rate of gross domestic product and growth rate of inflation as independent variable while the performance as measured Return on asset(ROA) as dependent variable. The significance calculated for each correlation is a secondary source of information about the reliability of the correlation. Therefore, the table below presents the correlations among the variables, which data taken from the annual report of the NBE, MoFED and the sampled commercial banks in the industry during the period 2005-2015.

Table 4.2 Pearson correlation matrix for among the variables

	ROA	NPLR	DGR	IND	IS	GDP	INF	CON	BS
ROA	1.0000								
NPLR	-0.0631	1.0000							
DGR	-0.5906	-0.1757	1.0000						
IND	0.5251	0.3440	-0.4465	1.0000					
IS	-0.0405	0.0723	-0.0768	0.2060	1.0000				
GDP	-0.2963	0.3423	0.1938	-0.0742	-0.1981	1.0000			
INF	0.0633	-0.0420	-0.0564	0.0030	0.1216	-0.4526	1.0000		
CON	0.4476	0.3008	-0.1116	0.0687	0.0079	-0.0184	-0.0078	1.0000	
BS	0.6730	0.0933	-0.4512	0.3041	0.0055	-0.4418	0.0133	0.7334	1.0000

* Source: Stata data output result computed from Annual report of Ethiopian Commercial Bank's, NBE and MoFED.

ROA was negatively correlated with non-performing loan ratio, deposit growth rate, interest rate spread and GDP growth while income diversification, bank size, inflation rate and industry concentration having positive correlation with the Bank's performance (ROA) of Ethiopian Commercial Bank's. As we can see from the Table 4.2, when non-performing loan ratio, deposit growth rate, interest rate spread and GDP growth rate are increases, the performance of Ethiopian Commercial Bank's decreases while increase in income diversification, bank size, inflation rate and industry concentration were increase the performance of the sampled Ethiopian Commercial Banks. The highest correlation is indicated between bank size and Return on asset as 0.673 approximately according to above table 4.2.

4.1.3. Unit root test

The study employed a panel research approach in testing the two hypotheses. The approach combines the attributes of time series and cross-sectional. Therefore, the researcher firstly tested the data and variables to a unit root test. Therefore, this is necessary in order to ascertain from the beginning, the researcher is dealing the nature of data and secondly, to know whether or not the result and invariably the findings can hold in the long run. Specifically, Augmented Dickey Fuller (ADF) unit root testing was conducted for this purpose through Stata version 12, software. Given the test results, it indicates that all the variables were at stationary level (**See the appendix table 4. 3**). Also, they are significant at 1%. Therefore, the results indicate that, whatever outcome the researcher gets from the hypotheses testing, the findings can hold in a long-run perspective.

4.1.4. Test normality Data

The most fundamental assumption in data analysis is normality, which considers the benchmark for statistical methods. Normality refers to the shape of data distribution for an individual metric variable. Normality is tested using graphical and statistical tests. The simplest test for normality is a visual check of the histogram that compares the observed data values with distribution approximating the distribution. This method is problematic for small's samples where the construction of the histogram can disfigure the visual portrayal to such an extent that the analysis is useless. The main statistical tests for normality which are available in most of the statistical programs are Shapiro-Wilk test (Hair J.et al.2006). A non –significant result (P-value of more than 0.05) indicates that the distribution is normal. Meanwhile, a significant result (P-value of less than 0.05) indicates that the distribution violates the assumption of normality which is common in large samples (Pallant, 2005). In this paper the normality test data result shows the P-value most variable less than 0.05 (**see appendix table4.4**). Therefore, this model is violates by normal distributions. This model used large sample size and, therefore, there is no serious departures from the assumption of normality of the error terms were detected.

4.1.5. Heteroscedasticity Test

It states that the variance of the error term is constant in regression results (Gujrati, 2004).

$$E\ [\epsilon/\ X] = 0$$

Heteroscedasticity is to be present in a model if the variances of the error- term of the different observation are not the same ((Gujrati, 2004). The Breusch-pagan test is considered to identify any linear form of heteroscedasticity. This test is an option built into stata. This paper analyze Breusch-pagan test to check if there is any problem of heteroscedasticity. The Breusch-pagan tests of the null hypothesis that the error variances are all equal versus the alternative that the error variance are a multiplicative function of one or more variables.

The paper made the following hypothesis:

H0: Heteroscedasticity is not present.

H1: Heteroscedasticity is present

After heteroscedasticity test, the result is found P-value is 0.641 (**see Appendix table 4. 5)** which is more than 5% of level of significance. As a result the researcher does not reject heteroscedasticity. Therefore, this model does not face any heteroscedasticity problem, because the correlation coefficients between independent variable are fairly small.

4.1.6. Testing for Multicolinearity

Multicolinearity exists when the independent variables are highly correlated. Usually the multicolinearity is exist if the correlation between two independent variables is more than 0.9(r=0.9 or above) (pallant, 2005). As it appears in the correlation matrix table below, there is no such high correlation between independent variables. Variance inflation factor VIF is widely used method to test for multicolinearity; it measures the increasing in the variance of a coefficient as result of collinearity. Also tolerance (TOL) is a commonly used measure of collinearity and multicolinearity. It is represented by 1-R*, where R* is the coefficient of the determination for the prediction of a variable by other independent variables. As a tolerance value smaller, the variable is more highly predicted by other independent variables.

Variable inflation factor is directly related to the tolerance value (VIF=1/TOL). More than10 for VIF values or TOL less than 10 indicates high degrees of collinearity or multicolinearity among the independent variables (Hair j.,Babin B, Anderson and Talham 2006). Having guidance from the correlation matrix, variables are tested for multicolinearity using stata software for each relationship testing the values of variance inflation factor (VIF) and tolerance (TOL). As result, VIF and tolerance results are acceptable and prove that the data is free of multicolinearity.

Table 4.6 testing for multicolinearity

Variable	VIF	1/VIF
BS	7.59	0.131709
CON	4.90	0.204246
GDP	3.30	0.303220
DGR	1.77	0.566517
IND	1.64	0.610852
NPLR	1.60	0.624849
INF	1.58	0.631739
IS	1.20	0.836130
Mean VIF	2.95	

* Source: Stata data output result computed from Annual report of Ethiopian Commercial Bank's, NBE and MoFED.

As we can see from the above table: 6 all VIF and TOL are acceptable and prove that there is no multicolinearity problem.

4.2. Random Effect versus Fixed Effect Models

The question which model is more appropriate FEM or REM is very difficult to answer**.** According to Judge et al, (1980) recommend a few suggestions which are related to the context of the data, and its environment beside the correlation between error component and regressions. If it is assumed to be uncorrelated, random effects may be appropriate, whereas if correlated, fixed effects are unbiased and then are more appropriate. The Hausman (1978) specification test can be used to determine the appropriate method i.e. fixed or random effects models. However, econometricians seem to be united generally that the random effects model is more appropriate to be used if individual are drawn randomly from a large population. By contrast, the FEM is more appropriate in the case of focusing on specific sets of the firms.

An important test for model specifications is to decide whether the FEM or REM is more appropriate Maddala, (2001). The null hypothesis is that the residuals in the random effects (REM) are uncorrelated with the regressions and that the model is correctly specified. Consequently, the estimated coefficients by the REM or FEM should be statically equal.

Otherwise, the REM estimator is inconsistent. If the null hypothesis is rejected, then the units specific effects are correlated with the Regressors or the models are not correctly specified (Baltagi 2005). In other words, the null hypothesis states that individual effects are not correlated with the other Regressors in the model. If correlated (Ho is rejected) a random effects model produces biased estimators, so the fixed effects model is preferred (Hun Myoung park 2005).

To put it more simply, the idea behind this test is that if Ui is uncorrelated with xit then there is no difference between estimates from both fixed effects (within the group's estimator) or random effects (GLS estimators) models.
Ho: ui are not correlated with xit
H1: ui are correlated with xit

Under the null hypothesis, random effects would be consistent and efficient (i.e. Ho is true), but under the alternative hypothesis, random effects would be inconsistent. The FEM is consistent whether the null hypothesis is true or not, this means if the hausman test is significant then we accept the alternative hypothesis that there is a correlation between individual effects and xit (Baltagi, 2005).

The Hausman test tests the null hypothesis that the coefficients which are estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. Therefore, this includes insignificant P-value, Prob >chi2 larger than 0.05, then it is more suitable to use random effects model.

Table 4. 7 Hausman specification test

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	random	Difference	S.E
NPLR	-.1673742	-.1539942	-.0133799	.0060426
DGR	-.0060075	-.0073447	.0013372	.
IND	.0644631	.0544314	.0100316	.0041574
IS	-.5589479	-.5069996	-.0519483	.
GDP	-.0210929	-.0569823	.0358894	.040531
INF	.0052594	.0023671	.0028923	.
IND.CON	.1113226	.0353306	.075992	.0236161
BS	-.0000648	-8.50e-06	-.0000563	.0007776

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(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)

=   10.40

Prob>chi2 =   0.2380

(V_b-V_B is not positive definite)

* Source: Stata data output result computed from Annual report of Ethiopian Commercial Bank's, NBE and MoFED.

According to above table shows Hausman specification test the model has the value of p= 0.238 for the regression model of dependent and independent variables. **This shows random effect** model is more appropriate, because the null hypothesis is not rejected. Therefore, this includes insignificant P-value, Prob >chi2 larger than 0.05, then it is more suitable to use random effects. Therefore the researcher used the random effects models.

4.3. Regression result

Regression analysis is a statistical technique used to test the relationship between one dependent variable and one or several independent (predictor) variables. Overall, the result derived from this study show signs that are consistent with theoretical predictions. The regression proved to be statistically significant at 0.05 (5%) for each of the performance ratios measured by Return on asset used in this model. The Haussmann specification test confirms the superiority of random effect models over the fixed effects model as we can see above table 4.7.

This section tests the proposed hypotheses for the relationship between credit risk factors as independent variables and a bank's performance (ROA) as dependent variable.

Table 4.8 Regression Result: Random effect regression model

ROA	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
CONS	.0491863	.0326738	1.51	0.137	-.0159477	.1143203
NPLR	-.1673742	.02588	-6.47	0.000**	-.2189651	-.1157832
DGR	-.0060075	.0013043	-4.61	0.000**	-.0086076	-.0034075
IND	.0644631	.0089197	7.23	0.000**	.0466821	.0822441
BS	-.0000648	.0015171	-0.04	0.966	-.003089	.0029595
CON	.1113226	.0251999	4.42	0.000**	.0610874	.1615577
IS	-.5589479	.1793402	-3.12	0.003**	-.916456	-.2014397
GDP	-.0210929	.1196969	-0.18	0.861	-.2597043	.2175185
INF	.0052594	.0071005	0.74	0.461	-.0088952	.019414
sigma_u	.0135916					
sigma_e	.00531385					
Rho	.8674123	(fraction of variance due to u_i)				
R^2	0.7600					
Adjusted R^2	0.7357					
No of Obs	88					

*Note ** Significant at 1% level.*

* Source: Stata data output result computed from Annual report of Ethiopian Commercial Bank's, NBE and MoFED.

$$ROA_{i,t} = \alpha + \beta_1 NPLR_{i,t} + \beta_2 DGR_{i,t} + \beta_3 IND_{i,t} + \beta_4 BS_{i,t} + \beta_5 CON_{i,t} + \beta_6 IS_t + \beta_7 GDP_t + \beta_8 INF_t + U_{i,t}$$

$$ROA_{i,t} = 0.049 - 0.167NPLR_{i,t} - 0.006DGR_{i,t} + 0.064 - 0.0001BS_{i,t}$$
$$+0.111CON_{i,t} - 0.559IS_t - 0.021GDP_t + 0.005INF_t + U_{i,t}$$

The above Table shows that the regression result of banks performance which is measured by ROA as dependent variable while the explanatory variables were bank specific, industry specific and macroeconomic variables. R-squared is measured the goodness of fit of the explanatory variables in explaining the variations in banks performance. As clearly described in Table 4.8 R-squared value for the regression model was 0.76. This indicates the explanatory variables in this study jointly explain about 76% variation in the performance measure, return on asset. The remaining 24% variation in the performance of Commercial banks has explained by other variables which are not included in the model. Therefore, these explanatory variables together, are good explanatory variables of the performance of Commercial banks in Ethiopia.

Based on the results shown in Table 4.8,non-performing loan ratio, deposit growth rate, income diversification, industry concentration and interest rate spread were statistically significant at 1% significant level while bank size, GDP growth and inflation rate had insignificant impact on banks performance since the p-value for the variables was greater than 10% significant level.

As it can be seen from Table 4.8, nonperforming loan ratio, deposit growth rate, bank size, interest rate spread and GDP growth with coefficients value of -0.167,-0.006,-0.0001,-0.559 and -0.021 respectively have affected the banks performance negatively. The negative sign indicates that there was an inverse relationship between those independent variables and ROA, the increase of those variables were lead to a decrease in ROA. On the other hand, other variables such as income diversification, industry concentration and inflation rate have a positive relationship with return on asset as far as its coefficient 0.064, 0.111 and 0.005 respectively. This revealed that there were a direct relationship between those independent variables and return on asset.

4.4. Discussion of the Result

The overall objective of this study was to examine the impact of credit risk management on performance of commercial banks in Ethiopia. To achieve these objectives elven years panel data for eight commercial banks were analyzed using linear multiple regression model. To be able to see the effects over years and across banks, panel data was used. In this study the impact of credit risks management on banks performance were explained. It was found that bank specific, industry specific and macroeconomics variables were significantly affect the performance of commercial banks in Ethiopia. The estimation results that present the impact of explanatory variables on ROA were discussed and analyzed based on the theoretical predictions, prior empirical studies and hypothesis formulated for this study as follows:

The random effect regression model Table 4.8 shows the coefficient of the variable representing non-performing loan ratio (non-performing loan/total loan) has negative and significant impact on the bank performance measured by ROA. Negative association implies that an increase in the ratio of nonperforming loans to total loans; certainly Lead to a decrease in bank performance as measured by ROA. The variable was also statistically significant at 1% significance level and this finding was consistent with the results of Epure and Lafuente (2012) and Ongore and Gemechu (2013) concluded that there is a negative relationship between NPLR and bank performance. The coefficient -0.167 implies that the one unit increased on NPLR has a 0.167 unit change on profitability but opposite direction. Therefore the study can conclude as the ratio of nonperforming loans to total loans was a key driver of performance of commercial banks in Ethiopia over the study period. This finding is also in line with the researcher expectation.

Another coefficient of variable representing the growth in bank deposit which is measured by dividing current year's deposits by previous year's deposits minus one has a beta of -0.006 with P-value 0.000. This implies over the study period the deposit growth rate has affected the performance of commercial banks in Ethiopia negatively and significantly at 1% significance level. The negative coefficient of this shows that there

was an inverse relationship between deposit growth rates and bank performance which reveals an increase in bank deposit lead to decreases the bank performance ROA. This implies that for one unit change in the banks' deposit, keeping other thing constant had resulted 0.006 unit changes on the levels of ROA in opposite direction. This means that when banks keep Birr 1 as a deposit, they lose 0.006 Birr as a profit. This research finding is consistent with the prior empirical evidence Ommeren and Belayeneh(2011), they believed that, Since, time and savings, deposits represent a relatively higher cost source of funds, the more a commercial bank is committed to time and saving deposit, the higher would be the funding cost and hence the lower the profits.

In addition to this the research finding was also consistent with Jabbar (2014), if the deposit growth was extended as bad loans, they could bring negative effects on performance of banks. However, this finding is contradicted with the finding of some researchers Naceur (2003) explained that the bank deposit growth has positive and significant impact on bank performance the more deposits are transformed into loans for earning interest incomes from borrowers. The higher the interest rate margins, the higher the profits and banks are able to shield themselves against hazards of credit risk resulting from adverse selection and moral hazard. It also contradicts with the findings of (Rasiah, 2010 and Moin, 2008), they suggested that, the primary function of the commercial banks are collecting deposits and giving loan to the public from this deposit. So, the competitiveness and the profitability of the bank is depend on the degree of well performing of this activity.

The regression coefficient variable the ratio of non-interest income to total income, which measures the level of diversification of a bank's activities, is found to have statistically significant and positive impact on performance of bank ROA. This coefficient was positive as the researcher expected, it was statistically significant at 1% significance level (p-value = 0.000). A positive and significant association between this variable and performance reveals that commercial banks in Ethiopia that earned a higher proportion of their income from sources other than interest tend to report higher level of profits over the study period. This result is consistent with previous findings such as Mohana and

Tekeste (2012) and Tesfaye (2014) on determinant of Ethiopia commercial bank performance.

The panel data random effect regression model Table 4.8 above shows the coefficient variable the bank size which is measured by the log of total asset has a beta value of -0.0001with p-value of 0.966. This shows that bank size affects the performance of the bank negatively but insignificantly over the study period. The negative sign indicates that there is an inverse relationship between bank size and performance of commercial banks in Ethiopia over the study period which reveals that large commercial banks perform lower than smaller commercial banks as the banks are becoming extremely large, the bureaucratic procedures have negatively affected their performances. The result was consistent with the previous studies of Dietrich et al. (2009) and Ezra (2013) found negative relationship between bank size and performance suggesting that the smaller the bank, the more efficient in resource utilization. In contrast, Gul (2011), Athanasoglou et al.(2006), Sufian et al. (2009), Yadollahzadeh et al.(2013), Sarita et al.(2012), Masood et al.(2012) suggesting that large banks may benefited from economies of scale. Therefore, the finding of this study shows that in Ethiopian banking industry the large bank size perform lower than the smaller banks. Therefore, the researcher fails to reject the hypothesis that states there is a positive relationship between bank size and bank performance in Ethiopia.

The regression Table 4.8 also indicates that the industry concentration has beta of 0.111 with probability value of 0.000. This indicated that industry concentration has a positive and significant impact at 1% level of significance on the performance commercial banks in Ethiopia ROA. The finding reveals that the effect of industry concentration in Ethiopian banking industry is significant and also it varies with the measure of performance used. Based on the regression result, this study rejects the hypothesis which says there is negative relationship between industry concentration and bank performance ROA. A positive sign of this variable could indicate a high degree of concentration because banks in highly concentrated markets tend to collude and thus, earn monopoly profits. This supports the Structure-Conduct Performance hypothesis. According to the Structure-Conduct Performance hypothesis collusion may result in higher rates being

charged on loans and less interest rates being paid on deposits. Thus, the positive sign of concentration may characterize the nature of Ethiopian banking sector as oligopoly type. This may indicate a need for more competition. Results are similar to those found by Dietrich et al, (2009), Sufian (2011) and Naceur (2003).

Table 4.8 indicates that the variables namely interest spread which is defined by the difference between average lending rate and deposit rate has significant influence on performance of banks ROA. A p-value of 0.003 and coefficient of -0.559 means the variable interest rate spread had negatively and significantly influences the dependent variable ROA at 1% level of significance. The negative sign against the coefficient of interest rate spread suggest a negative relationship with ROA. This means that the one unit change in IS will have an effect of 0.56 unit change on the ROA to the opposite direction. Both the result as well as the coefficient is in contrast than what the researcher has expected. And also, this finding is contradicted with the earlier empirical findings Vong and Chan(2008) ,suggesting that the gap between lending interest rate and saving interest rate (spread) most of the time it provide positive return to the profitability of the banks. However, the possible reason for this study may happen a negative relationships between interest rate spread and bank performance ROA over the study period was the movements in the average interest rate on time and demand deposits reflect the change in the proportion of commercial bank deposits that would paid higher interest rate on time and demand deposits, rather than the change in lending interest rate, which would have reduced the bank profit ROA.

The other possible reason may when loan was non-performing, interest income is suspended and calculated at the time of collection and it requires additional provision. Based on this fact, non-performing loan means no interest income, rather provision expense for estimated uncollected amount. Because of this interest rate spread has affected the bank profitability negatively and significantly over the study period.

The result of the regression shows that GDP growth rate had statistically insignificant impact on ROA, the probability 0.861and coefficient -0.021 was not help the researcher to reject the null hypothesis and to accept the alternate. The coefficient sign for real GDP

growth rate was negative which in contrary to the researcher expectation. This indicate that the change in GDP affect the bank performance negatively but insignificantly. Similar findings were drawn by Liu and Wilson (2009) and according to these researchers negative association between ROA and GDP growth imply that high economic growth improves business environment and lowers bank entry barriers which increases competition and ultimately dampening bank profitability (ROA). Also negative correlation is emanating from simultaneous rise in aggregate loan and advances level and non-performing loans which at the end nullified benefits (interest income) embodied by increase in aggregate loans and advances.

The other macroeconomic variable inflation has coefficient of 0.005 with p-value 0.461 is also found statistically insignificant but it is positively related to bank performance ROA. The positive sign of this variable indicates that inflation was anticipated by bank managers over the study period, enabling bank managers to timely adjust interest rates to curb the cost of inflation. This finding was consistent with the finding by Sufian (2011), Li (2007), and Alexiou and Sofoklis (2009). The effect of inflation on bank profitability depends on the ability of inflation forecast by the bank's management. If predictions become correct, such adjustments in interest rates could be incorporated in inflation expectation, to achieve higher profits. In this case, the effect to bank profitability becomes positive. A positive relationship between inflation and bank profitability would suggest that banks are able to project the effect of inflation expectations in their operational costs to increase profits. If the forecast is incorrect, the effect of inflation on bank's profitability could be negative.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

Generally, it is fact that a strong and healthy financial system is a prerequisite for sustainable economic growth of any country. In order to survive negative shocks and maintain a good financial stability, it is important to identify the major bank risk that mostly influences the overall performance and profitability of commercial banks. The overall objective of this study was to examine the impact of credit risk management on performance of commercial banks in Ethiopia. In addition to the above general objective the study specified an empirical framework to investigate the impact of bank-specific, industry-specific and macroeconomic variable factors on the performance of commercial banks in Ethiopian for the last eleven years from 2005 to 2015. The study also used an appropriate econometric methodology for the estimation of variables coefficient under random effect regression models. The following sections discussed about the final conclusion remarks of the study and applicable recommendations.

5.1. Conclusion

The study concluded that NPLR, deposit growth rate, income diversification, industry concentration and Interest rate spread, had a statistically significant effect on the level of ROA while bank size, GDP growth and inflation rate has the insignificant effect on ROA of commercial banks in Ethiopia over the period under consideration.

According to the regression results, the findings indicated that bank credit risk management measured in terms of NPLR had negative and statistically significant impact on ROA. This implies that the commercial bank in Ethiopia have poor credit risk management practices over the study period, since there is high levels of the non-performing loans in their loans portfolios. This high level of the NPLs, lower the banks profit due to the loan losses to the provision expenses increases. This implies that banks can make a profit as far as they can minimize their non-performing loan ratio.

Again the regression analysis reveals a negative and significant relationship between deposit growth rate and banks performance ROA. This suggests over the study period an

increase in bank deposit of commercial banks in Ethiopia would lead to decrease ROA. The main reason for this is over the study period commercial banks has paid relatively higher on time and saving deposit and relatively low on investment funds or loans which would incur higher cost source of funds, the more a commercial bank is committed to time and saving deposit, the higher would be the funding cost and hence the lower the profits. The other reason is if the bank deposit growth is not converted to loan it would be higher cost to the bank since they would have incur higher cost on time and saving deposit which is consequently affects the bank profit negatively.

The random effect model regression result shows that a positive and statistically significant relationship between diversification and ROA. This indicates that the bank which diversifies their source of income from sources other than interest income tends to earn higher level of profits. This indicates that over the study period most banks have gradually transforming their sources of income from the traditional business of financial intermediation towards provision of other financial services like money transfer. The last bank specific factor in this study bank size has a negative and insignificant impact on bank performance ROA. The negative sign indicates that the large commercial banks perform lower than smaller commercial banks as the banks are becoming extremely large, the bureaucratic procedures have negatively affected their performances

The result from the regression analysis also shows the industry specific factors industry concentration has positive and statistically significant impact banks performance ROA. A positive sign of this variable could indicate a high degree of concentration because banks in highly concentrated markets tend to collude and thus, earn monopoly profits.

The panel data random effect regression result has found that among the macro-economic variables interest rate spread has a negative and statistically significant impact banks performance ROA while real GDP growth rates and inflation rate have no significant impact on banks' performance ROA. However, this study concludes GDP growth rate has a negative impact while inflation growth rate has positive impact on the performance commercial banks in Ethiopia over the study period though they are insignificant.

5.2. Recommendations

Based on the findings and conclusions of the study the following recommendations are given.

❖ The bank should make screening out their borrower, adverse selection and moral hazard behavior before going to inject the loan since high level of non-performing loan ratio would lead increase the provision expense held for non-perform loan which consequently affecting the bank performance(profitability) negatively.

❖ The bank should diversify their income sources- The share of income from foreign operation in the form of service charge is found to be one of key drivers of the performance of Ethiopian Banks. Hence, banks should divert their attention towards maintaining the proper mix of non-interest bearing assets which can generate fee incomes and their loan exposures. The focus to introduce fee based services which are less exposed to credit risk should be one of the areas that Ethiopian banks need to work for in the future if they need to sustain their profitability performance.

❖ The positive sign between concentration and profitability evidences the prevalence of collusion among the Ethiopian commercial banks, making some banks to earn monopoly profits by charging higher rates on loans and paying lower rates on deposits. The bank top management should be cautious in expanding their branches up to a certain limit and then diversifying their service charge and to become more competitive industry.

❖ The negative association between the growth in a bank deposit and the bank performance ROA over the study period was due the commercial banks in Ethiopia has incurred high costs in time and saving deposit, but this deposit growth are not transformed into loans for earning interest incomes from borrowers. Therefore, the managers of commercial banks in Ethiopia should be converted the deposit growth in to loan by holding the minimum cash deposit which set by the national bank of Ethiopia (NBE). And the regulatory organ should regulate the banks to have the minimum deposit unless should have taken corrective measure.

❖ The bank should expand their size up to a certain limit. Expanding their size beyond the certain limit could bring negative impact on bank performance due to bureaucratic and other reasons. The large commercial banks should improve managerial efficiency and the bureatratic bottlenecks system to reduce diseconomy scale of large size banks.

❖ The negative sign between interest rate spread and bank performance ROA over the study period was indication of the movements in the average interest rate on time and demand deposits reflect the change in the proportion of commercial bank deposits that would pay higher interest rate on time and demand deposits, rather than the change in lending interest rate, which would have a negative impact on the bank profit ROA. Therefore, the managers of commercial banks in Ethiopia should be cautious in moving between the minimum and maximum time and demand deposit interest rate which is set by the National bank of Ethiopia (NBE). The bank regulator and the policy maker should take corrective action on interest rate adjustment as soon as possible.

❖ Though the macroeconomics variable factors like GDP and inflation are statistically insignificant, their signs provide relevant policy implications, and thus, should not be undermined. The signs of inflation and GDP as well provide important implications for policy makers and bank regulators. Thus, policy makers, and bank regulators should focus on formulating policies aimed at making the banking sector more competitive.

❖ The bank should give attention to keep the impact of all bank specific factors, industry specific factors and macroeconomic variable factors on the performance of banks ROA.

❖ The study suggests that a further study should be done on the impact of credit risk management on performance of commercial banks in Ethiopian by taking additional variables as credit risk management to determine how banks can be profitable with the risk amount they took to do the business.

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Appendix
Appendix: 1 for Pearson correlation

	ROA	NPLR	DGR	IND	IS	GDP	INF	CON	BS
ROA	1.0000								
NPLR	-0.0631	1.0000							
DGR	-0.5906	-0.1757	1.0000						
IND	0.5251	0.3440	-0.4465	1.0000					
IS	-0.0405	0.0723	-0.0768	0.2060	1.0000				
GDP	-0.2963	0.3423	0.1938	-0.0742	-0.1981	1.0000			
INF	0.0633	-0.0420	-0.0564	0.0030	0.1216	-0.4526	1.0000		
CON	0.4476	0.3008	-0.1116	0.0687	0.0079	-0.0184	-0.0078	1.0000	
BS	0.6730	0.0933	-0.4512	0.3041	0.0055	-0.4418	0.0133	0.7334	1.0000

Appendix: 2 Unit root test

Levin-Lin-Chu unit-root test for ROA

Ho: Panels contain unit roots   Number of panels =   8

Ha: Panels are stationary   Number of periods =   11

ADF regressions: 1lag

LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

	Statistic	p -value
Unadjusted t	7.8262	
Adjusted t*	5.2975	0.0000

Levin-Lin-Chu unit-root test for NPLR

Ho: Panels contain unit roots   Number of panels =   8

Ha: Panels are stationary   Number of periods =   11

ADF regressions: 1lag

LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

	Statistic	p-value
Unadjusted t	4.2610	
Adjusted t*	2.1572	0.0155

Levin-Lin-Chu unit-root test for DGR

Ho: Panels contain unit roots   Number of panels =   8

Ha: Panels are stationary   Number of periods =   11

ADF regressions: 1lag

LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

	Statistic	p-value
Unadjusted t	16.7732	
Adjusted t*	16.5368	0.0000

Levin-Lin-Chu unit-root test for IND

Ho: Panels contain unit roots   Number of panels =   8

Ha: Panels are stationary   Number of periods =   11

ADF regressions: 1lag

LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

	Statistic	p-value
Unadjusted t	6.8397	
Adjusted t*	4.8508	0.0000

Levin-Lin-Chu unit-root test for IS

Ho: Panels contain unit roots   Number of panels =   8

Ha: Panels are stationary   Number of periods =   11

ADF regressions: 1lag

LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

	Statistic	p-value
Unadjusted t	7.9921	
Adjusted t*	5.4761	0.0000

Levin-Lin-Chu unit-root test for GDP

Ho: Panels contain unit roots   Number of panels =   8

Ha: Panels are stationary   Number of periods =   11

ADF regressions: 1lag

LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

	Statistic	p-value
Unadjusted t	5.6807	
Adjusted t*	3.1331	0.0009

Levin-Lin-Chu unit-root test for INF

Ho: Panels contain unit roots   Number of panels =   8

Ha: Panels are stationary   Number of periods =   11

ADF regressions: 1lag

LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

	Statistic	p-value
Unadjusted t	10.4314	
Adjusted t*	6.2011	0.0000

Levin-Lin-Chu unit-root test for CON

Ho: Panels contain unit roots   Number of panels =   8

Ha: Panels are stationary   Number of periods =   11

ADF regressions: lag

LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

Statistic		value
Unadjusted t	3.4254	
Adjusted t*	0.7133	0.2378

Levin-Lin-Chu unit-root test for BS

Ho: Panels contain unit roots   Number of panels =   8

Ha: Panels are stationary   Number of periods =   11

ADF regressions: 1lag

LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

Statistic		p-value
Unadjusted t	7.0574	
Adjusted t*	6.6043	0.0000

Appendix: 3 Normality test

Shapiro-Wilk W test for normal data

Variable | Obs   W   V   z   Prob>z

-------------+--

ROA | 88   0.86418   10.084   5.091   0.00000

Shapiro-Wilk W test for normal data

Variable | Obs   W   V   z   Prob>z

-------------+--

nplr | 88   0.65933   25.293   7.116   0.00000

Shapiro-Wilk W test for normal data

 Variable | Obs   W   V   z   Prob>z

 ------------+--

DGR | 88   0.32439   50.161   8.624   0.0000

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
IND	88	0.95983	2.983	2.407	0.00804

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
IS	88	0.73802	19.451	6.538	0.00000

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
GDP	88	0.98591	1.046	0.100	0.46016

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
INF	88	0.90962	6.710	4.193	0.00001

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
CON	88	0.50487	36.762	7.940	0.00000

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
bs	88	0.96734	2.425	1.951	0.02551

Appendix: 4 Heteroscedasticity test table

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

$$chi2\ (1)\ \ =\ \ 0.22$$

Prob >chi2 = 0.6410

Appendix: 5 Hausman test

	---- Coefficients ----			
	(b)	**(B)**	**(b-B)**	**sqrt(diag(V_b-V_B))**
	fixed	random	Difference	S.E
NPLR	-.1673742	-.1539942	-.0133799	.0060426
DGR	-.0060075	-.0073447	.0013372	.
IND	.0644631	.0544314	.0100316	.0041574
IS	-.5589479	-.5069996	-.0519483	.
GDP	-.0210929	-.0569823	.0358894	.040531
INF	.0052594	.0023671	.0028923	.
IND.CON	.1113226	.0353306	.075992	.0236161
BS	-.0000648	-8.50e-06	-.0000563	.0007776

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

$$chi2(8) = (b\text{-}B)'[(V\_b\text{-}V\_B)\hat{}(\text{-}1)](b\text{-}B)$$

$$=\ \ \ 10.40$$

$$Prob\text{>}chi2 =\ \ \ 0.2380$$

(V_b-V_B is not positive definite)

Appendix: 6 fixed effects regression analysis

Fixed-effects (within) regression   Number of obs   =   88

Group variable: comp   Number of groups =   8

R-sq: within = 0.7422   Obs per group: min =   11

Between = 0.7172   avg =   11.0

Overall = 0.5369   max =   11

F(8,72)   =   25.91

corr(u_i, Xb) = -0.8742   Prob > F   =   0.0000

ROA	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
CONS	.0491863	.0326738	1.51	0.137	-.0159477	.1143203
NPLR	-.1673742	.02588	-6.47	0.000	-.2189651	-.1157832
DGR	-.0060075	.0013043	-4.61	0.000	-.0086076	-.0034075
IND	.0644631	.0089197	7.23	0.000	.0466821	.0822441
BS	-.0000648	.0015171	-0.04	0.966	-.003089	.0029595
CON	.1113226	.0251999	4.42	0.000	.0610874	.1615577
IS	-.5589479	.1793402	-3.12	0.003	-.916456	-.2014397
GDP	-.0210929	.1196969	-0.18	0.861	-.2597043	.2175185
INF	.0052594	.0071005	0.74	0.461	-.0088952	.019414
sigma_u	.0135916					
sigma_e	.00531385					
rho	.8674123	(fraction of variance due to u_i)				
R^2	0.7600					
Adjusted R^2	0.7357					
No of Obs	88					

CONSOLIDATED FINANCIAL STATEMENT ORGANIZED DATA FROM SAMPLED COMMERCIAL BANKS IN ETHIOPIA, NBE AND MOFEDFOR THE PERIOD 2005- 2015

year	comp	ROA	NPLR	DGR	IND	IS	GDP	INF	CON	BS
2005	CBE	0.024	0.212	0.126	0.532	0.082	0.126	0.061	0.513	10.409
2006	CBE	0.031	0.177	0.115	0.541	0.081	0.115	0.106	0.496	10.486
2007	CBE	0.027	0.142	0.162	0.540	0.081	0.118	0.158	0.460	10.678
2008	CBE	0.027	0.061	0.145	0.481	0.084	0.112	0.253	0.488	10.828
2009	CBE	0.046	0.031	0.156	0.387	0.090	0.100	0.364	0.485	10.992
2010	CBE	0.038	0.018	0.257	0.390	0.092	0.106	0.028	0.521	11.214
2011	CBE	0.044	0.009	0.557	0.416	0.082	0.113	0.181	0.450	11.646
2012	CBE	0.058	0.006	0.410	0.421	0.082	0.088	0.341	0.526	11.971
2013	CBE	0.048	0.022	0.286	0.305	0.082	0.097	0.135	0.535	12.183
2014	CBE	0.058	0.021	0.252	0.302	0.082	0.103	0.081	0.635	12.400
2015	CBE	0.048	0.017	0.250	0.290	0.082	0.102	0.076	0.678	12.624
2005	AIB	0.017	0.062	0.299	0.369	0.082	0.126	0.061	0.036	7.708
2006	AIB	0.026	0.049	0.323	0.399	0.081	0.115	0.106	0.044	7.991
2007	AIB	0.037	0.043	0.212	0.375	0.081	0.118	0.158	0.050	8.251
2008	AIB	0.030	0.046	0.243	0.407	0.084	0.112	0.253	0.050	8.481
2009	AIB	0.022	0.055	0.370	0.457	0.090	0.100	0.364	0.052	8.768
2010	AIB	0.027	0.072	0.218	0.558	0.092	0.106	0.028	0.047	9.108
2011	AIB	0.033	0.037	0.246	0.574	0.082	0.113	0.181	0.042	9.314
2012	AIB	0.030	0.018	0.189	0.398	0.082	0.088	0.341	0.047	9.482
2013	AIB	0.025	0.024	0.370	0.373	0.082	0.097	0.135	0.050	9.786
2014	AIB	0.028	0.028	0.230	0.366	0.082	0.103	0.081	0.053	10.004
2015	AIB	0.026	0.015	0.210	0.365	0.082	0.102	0.076	0.051	10.135
2005	DB	0.021	0.032	0.301	0.444	0.082	0.126	0.061	0.063	8.137
2006	DB	0.029	0.027	0.303	0.341	0.081	0.115	0.106	0.076	8.422
2007	DB	0.031	0.025	0.317	0.340	0.081	0.118	0.158	0.086	8.706
2008	DB	0.031	0.023	0.265	0.373	0.084	0.112	0.253	0.085	8.966
2009	DB	0.026	0.023	0.288	0.425	0.090	0.100	0.364	0.086	9.183
2010	DB	0.026	0.022	0.280	0.499	0.092	0.106	0.028	0.077	9.422
2011	DB	0.031	0.020	0.167	0.529	0.082	0.113	0.181	0.064	9.593
2012	DB	0.037	0.021	0.188	0.480	0.082	0.088	0.341	0.073	9.771
2013	DB	0.031	0.022	0.127	0.438	0.082	0.097	0.135	0.066	9.891
2014	DB	0.032	0.019	0.115	0.468	0.082	0.103	0.081	0.047	9.997
2015	DB	0.029	0.017	0.121	0.438	0.082	0.102	0.076	0.046	10.117
2005	BOA	0.030	0.049	0.276	0.309	0.082	0.126	0.061	0.038	7.629
2006	BOA	0.030	0.031	0.338	0.250	0.081	0.115	0.106	0.047	7.949
2007	BOA	0.020	0.047	0.250	0.243	0.081	0.118	0.158	0.043	8.130

2008	BOA	0.003	0.089	0.278	0.273	0.084	0.112	0.253	0.046	8.359
2009	BOA	0.018	0.098	0.292	0.318	0.090	0.100	0.364	0.048	8.608
2010	BOA	0.022	0.074	0.143	0.442	0.092	0.106	0.028	0.042	8.745
2011	BOA	0.025	0.033	0.182	0.398	0.082	0.113	0.181	0.030	8.893
2012	BOA	0.026	0.027	0.115	0.313	0.082	0.088	0.341	0.027	9.017
2013	BOA	0.027	0.028	0.255	0.325	0.082	0.097	0.135	0.012	9.226
2014	BOA	0.024	0.034	0.071	0.275	0.082	0.103	0.081	0.026	9.330
2015	BOA	0.021	0.027	0.222	0.292	0.082	0.102	0.076	0.025	9.523
2005	WB	0.030	0.051	0.470	0.467	0.082	0.126	0.061	0.030	7.388
2006	WB	0.031	0.048	0.380	0.455	0.081	0.115	0.106	0.036	7.723
2007	WB	0.032	0.044	0.532	0.422	0.081	0.118	0.158	0.046	8.155
2008	WB	0.034	0.059	0.089	0.446	0.084	0.112	0.253	0.045	8.325
2009	WB	0.035	0.061	0.257	0.505	0.090	0.100	0.364	0.044	8.541
2010	WB	0.039	0.040	0.052	0.563	0.092	0.106	0.028	0.035	8.656
2011	WB	0.040	0.045	0.519	0.614	0.082	0.113	0.181	0.033	8.995
2012	WB	0.040	0.030	-0.032	0.480	0.082	0.088	0.341	0.027	9.030
2013	WB	0.033	0.027	0.310	0.401	0.082	0.097	0.135	0.028	9.249
2014	WB	0.028	0.027	0.113	0.380	0.082	0.103	0.081	0.028	9.353
2015	WB	0.026	0.024	0.216	0.440	0.082	0.102	0.076	0.028	9.526
2005	UB	0.029	0.039	0.614	0.495	0.082	0.126	0.061	0.021	6.978
2006	UB	0.028	0.029	0.410	0.437	0.081	0.115	0.106	0.026	7.377
2007	UB	0.029	0.030	0.263	0.365	0.081	0.118	0.158	0.029	7.688
2008	UB	0.028	0.027	0.586	0.388	0.084	0.112	0.253	0.034	8.086
2009	UB	0.020	0.031	0.480	0.391	0.090	0.100	0.364	0.041	8.445
2010	UB	0.030	0.036	0.307	0.508	0.092	0.106	0.028	0.040	8.682
2011	UB	0.030	0.028	0.284	0.463	0.082	0.113	0.181	0.031	8.952
2012	UB	0.034	0.023	0.114	0.376	0.082	0.088	0.341	0.037	9.081
2013	UB	0.028	0.019	0.193	0.336	0.082	0.097	0.135	0.034	9.208
2014	UB	0.023	0.014	0.166	0.313	0.082	0.103	0.081	0.033	9.382
2015	UB	0.020	0.012	0.255	0.289	0.082	0.102	0.076	0.032	9.572
2005	NIB	0.027	0.041	0.470	0.385	0.082	0.126	0.061	0.031	7.457
2006	NIB	0.029	0.039	0.187	0.335	0.081	0.115	0.106	0.033	7.614
2007	NIB	0.029	0.034	0.294	0.293	0.081	0.118	0.158	0.034	7.866
2008	NIB	0.031	0.038	0.314	0.337	0.084	0.112	0.253	0.038	8.203
2009	NIB	0.032	0.046	0.335	0.405	0.090	0.100	0.364	0.041	8.478
2010	NIB	0.034	0.039	0.252	0.522	0.092	0.106	0.028	0.033	8.695
2011	NIB	0.035	0.041	0.250	0.493	0.082	0.113	0.181	0.030	8.870
2012	NIB	0.035	0.027	0.132	0.489	0.082	0.088	0.341	0.022	9.021
2013	NIB	0.031	0.025	0.140	0.410	0.082	0.097	0.135	0.025	9.121
2014	NIB	0.029	0.021	0.191	0.332	0.082	0.103	0.081	0.026	9.282
2015	NIB	0.025	0.015	0.234	0.262	0.082	0.102	0.076	0.027	9.492

2005	CBO	-0.008	0.003	1.143	0.033	0.082	0.126	0.061	0.002	4.860
2006	CBO	-0.024	0.008	5.533	0.040	0.081	0.115	0.106	0.004	5.412
2007	CBO	0.007	0.013	1.827	0.265	0.081	0.118	0.158	0.006	6.050
2008	CBO	0.021	0.012	0.769	0.263	0.084	0.112	0.253	0.007	6.519
2009	CBO	0.003	0.014	0.610	0.202	0.090	0.100	0.364	0.009	6.930
2010	CBO	0.018	0.025	0.739	0.417	0.092	0.106	0.028	0.011	7.478
2011	CBO	0.022	0.045	0.444	0.506	0.082	0.113	0.181	0.010	7.824
2012	CBO	0.030	0.006	0.413	0.434	0.082	0.088	0.341	0.013	8.208
2013	CBO	0.030	0.030	0.596	0.556	0.082	0.097	0.135	0.020	8.785
2014	CBO	0.050	0.018	0.221	0.522	0.082	0.103	0.081	0.018	8.902
2015	CBO	0.045	0.020	0.367	0.488	0.082	0.102	0.076	0.020	9.271

Abbreviation of sampled Commercial Banks in Ethiopia

1. CBE- Commercial Bank of Ethiopia

2. AIB- Awash International Bank

3. DB- Dashen Bank

4. BOA- Bank of Abyssinia

5. WB-Wegagen Bank

6. UB-United Bank

7. NIB- Nib International Bank

8. CBO- Cooperative Bank of Oromia