The Impact of Credit Risk on Profitability of Private Commercial Banks in Ethiopia

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STATEMENT OF CERTIFICATION

This is to certify that the thesis prepared by Tegegne Abera, entitled: "The Impact of Credit Risk on Profitability of Private Commercial Banks in Ethiopia." under my supervision.

This work is submitted in partial fulfillment of the requirements for Msc Degree in Accounting and Finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Tegegne Abera

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LIST OF ACRONYMS AND ABRIVATIONS

NBE: National Bank of Ethiopia

BS: Bank Size

NPLR: Non-performing Loan Ratio

CAR: Capital Adequacy Ratio

LTDR: Loan to Deposit Ratio

INF: General Inflation Rate

IS: Interest Spread

GDP: Gross Domestic Product

ROA: Return on Assets

ROE: Return on Equity

NPL: Non-performing Loans

TL: Total Loan

GCC: Gulf Cooperation Council

MENA: Middle East and North Africa

CA: Capital Adequacy

LLP: Loan Loss Provision

LA: Loans and Advances

EBIT: Earnings before Interest and Tax

ROE: Return on Equity

NIM: Net Interest Margin

CLA: Cost per Loan Asset

CLRM: Classical Linear Regression Model

OLS: Ordinary Least Square

CC: Correlation Coefficient

CI: Condition Index

VIF: Variance Inflation Factor

CAMEL: Capital Asset Management Earning and Liquidity

DW: Durbin-Watson

EPS: Earning Per Share

GDI: Gross Domestic Income

JB: Jarque-Bera

NII: Net Interest Income

NPLR: Non-performing Loan Ratio

OE: Operating Efficiency

PC: Provision Coverage

PLS: Panel Least Square

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ABSTRACT

The objective of the study is to empirically examine the impact of credit risk on profitability of private commercial banks in Ethiopia. Considering variables related to lending activities to determine bank specific, industry specific and macro-economic factors that affect banks financial performance over the period of 14 years (2003-2016). The empirical investigation uses the accounting measure of Return on Equity (ROE), which is the explained variable, to represent Banks' performance while nonperforming loan ratio, capital adequacy ratio, cost per loan asset ratio, bank size, and loan and advance to deposit ratio, inflation and GDP have been taken as explanatory variables. Secondary data are used for six banks which stayed in the industry more than fourteen years among sixteen private banks which are functional at the moment in Ethiopian banking industry. Data used for this analysis is obtained from banks' annual reports, National Bank annual reports and Ministry of Finance and Economic Development. To this end correlation and multiple regression analysis is done with fixed effect model and EView 7 software used to regress the data. Nonperforming loan ratio, cost per loan asset ratio and capital adequacy ratio had a significant impact on banks' profitability but inverse. In addition, loan to deposit ratio and gross domestic product have a positive significant impact on banks profitability. In general, bank specific factors and macroeconomic factor GDP have a significant impact on banks profitability while external factors inflation and interest rate spread had no significant impact on banks profitability.

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

CHAPTER ONE

1. INTRODUCTION

1.1. BACKGROUND OF THE STUDY

Banks are firms that efficiently provide a wide range of financial services for profit and the role of Banks remain central in financing economic activity and its effectiveness could exert positive impact on overall economy as sound and profitable (Tenguh NC, 2008). Banking sector is better able to withstand negative shocks and contribute to the stability of the financial system (Athanasoglou, Brissimis, and Delis, 2005). Commercial banks play a great role in developing economies as it accounts for more than 90 percent of their financial assets (ADB, 2013). Therefore, efficient intermediation of commercial banks is vital for developing economies in order to achieve high economic growth, while insolvency of them leads to economic crisis. However, intermediation function of commercial banks gives rise to different types of risks with different magnitudes on bank performance such as credit risk, liquidity risk, market risk, operational risk etc (Van Gestel & Baesens, 2008). Among the others credit risk is found most important type of banking risk (Abu Hussain& Al-Ajmi, 2012; Khalid & Amjad, 2012; A. Pereraet al, 2014).

Risk can be defined as a probability or threat of damage, injury, liability, loss, or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through preemptive action (Juanjuan S, 2009).It is also the probability of a loss or drop in value. Trading risk is divided into two general categories: (1) Systemic risk that affects all securities in the same class and is linked to the overall capital-market system and therefore cannot be eliminated by diversification (Funso et.al, 2012). It is also called market risk. (2) Nonsystematic risk is any risk that isn't market-related or is not systemic. It is also called non market risk, extra-market risk or un-systemic risk.

Credit risk management is a robust process that enables banks to proactively manage loan portfolios in order to minimize losses and earn an acceptable level of return for shareholders. It is essential for banks having robust credit risk management policies and procedures that are sensitive and responsive to these changes (Shawn T., 1998). National Bank of Ethiopia issued guidelines on the Credit risk management function and it emphasizes on Policy guidelines, organizational structure and responsibility and procedural guidelines.

Credit risk management is very important to banks as it is an integral part of the loan process (shahbaz haneef et-al, 2012). 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 (Olausi, 2014). Risk management is simply a practice of systematically selecting cost effective approaches for minimizing the effect of threat realization to the organization. All risks can be never fully avoided or mitigated simply because of financial and practical limitations (Moteff, 2005).

The risk management plan should propose applicable and effective security controls for managing risks (Bowen, P., 2005). A good risk management plan should contain a schedule for control implementation and responsible persons for those actions (Edward, 2005). It should also select appropriate controls or countermeasures to measure each risk. Risk mitigation needs to be approved by the appropriate level of management in order to increase profitability in a company. For example; a risk concerning the image of the organization should have top management decision behind (Payle, 1997).

Profitability refers to the positive gain from an investment or business operation after subtracting of all expenses (Richard Loth (20150. Profitability of a company is the difference between the income of the business and all its costs/expenses. A business that does not make profits will fail, potentially affecting employees, suppliers and the local community because their overall operations depend on profits. Profitability is the measure of the overall success of a company (Charles, 2013). It is a necessary coordination for survival. Investors could prefer a single measure of profitability that would be meaningful in all situations (Smirlock M., 1985). Test of profitability focuses on measuring the adequacy of income by comparing it with one or more primary activity that is measured in the financial statements (Sheffrin, 2003).

Bank is the most important financial institution in the economy. They play a vital role in the economy by providing means of payment and in mobilizing resource (Richard Loth, 2015). The economic development of a country depends on the development of banking sector to a great extent. The dependence on banking sector in modern economy is increasing day by day because this sector ultimately contributes to run the wheel of development in a more dynamic way. Today's modern banks are not only providing traditional banking services, rather banks are expanding the menu of financial services, and banks are making the untouchable service touchable for their customers (Wilson J., 2009). The changing and expanding role of banking has made the banking business more complex and competitive. For survival and growth of this business demands creativity, specialization and knowledge and adoption of new technology are

used. But technology, creativity, specialization all these cannot support a bank to survive unless the services are marketed in the right track. For this banks need experts who will able to run the business even in against the wind (Brenda, 2013).

In Ethiopia, as of 2016 there are sixteen private commercial banks operating under the direct supervision of National Bank of Ethiopia (CBE). Looking at the financial statements of these private commercial banks most of them are maintaining significant amount of provisions for loans and advances that strengthen the Basel Committee's on Banking Supervision (2005) assertion that loans are the largest and most obvious source of credit risk.

Banks provide the required capital to the economy in the form of loan and advances which might have some probability to fail to be paid back which is termed as credit risk, the chance that a loan will not be repaid timely. Hence the main concern of the banks is credit risk and its management as credit or loans and advances are the main source of income for them (Charles, 2013).

It is the realization of the high provision expense to the loan and advances made by the banks that this research work is inspired to see in detail the factors that are contributing to same and recommend solutions to mitigate the negative consequences on the profitability of the Ethiopian private Commercial Banks.

1.2. STATEMENT OF THE PROBLEM

Banks today are the largest financial institutions around the world, with branches and subsidiaries throughout everyone's life (Runkle D., 1993). 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, p.34). For instance, commercial banks hold deposits, bundling them together as loans, operating payments mechanism, etc.

Banks consciously take risk as they perform their role of financial intermediation economy (Tenguh NC, 2008). Consequently, they assume various risks, which include credit risk, interest rate risk, liquidity risk, internal control & compliance risk, money laundering risk, foreign exchange risk and operational risk. (Funso et-al., 2012). Managing risks is essential for their survival and prosperity. Among these risks management of credit risk gets most attention. Credit risk is one of the most vital risks for banks. It arises from nonperformance by a borrower (Greenawalt M., 1991). It may arise from either an inability or an unwillingness to perform in the pre-commitment contracted manner. The credit risk of a bank is also effect the book value of a bank. The more credit risk is in a particular, the more probability of a bank to be insolvent.

Therefore, the status of depositor in the bank is at risk and probability of incurring loss from their deposited value is increased.

Literatures on Ethiopian banking sector documented that credit risk and non-performing loan have been major challenges of bank performance in Ethiopian (Alemauhy, 1991; NBE, 2009; Tekilebirhan, Melkamu, 2012; Gethun, 2012; Mekonen, 2012). Nonetheless, very few (Mekasha, 2011; Tefera, 2011; Million, 2014) examined the extent to which credit risk affected profitability performance of banks in Ethiopia.

Local studies so far however did not consider some variables like age or size of banks (Economies of scale), and cost per loan asset/credit administration cost relation to performance of banks. These variables were among the factors considered in studies made in different countries (Pasiouras and Kosmidou, 2007, Appa, 1996, Guru et al., 2002 and BenNaceur, 2003). Besides, all previous studies focus public and private commercial banks together. Up to the knowledge of the researcher, there is no separate study on the impact of credit risk on private commercial banks in Ethiopia. Therefore, this study seeks to fill the gap by providing full information about the variables considered in the study and it is further believed that such as complete recognition of all factors would contribute to policy making and devise mitigating mechanisms as well as uses for further studies

1.3. OBJECTIVES OF THE STUDY

1.3.1. GENERAL OBJECTIVE

The general objective of the study is to assess the impact of credit risk on profitability of private commercial banks that operate in Ethiopia.

1.3.2. SPECIFIC OBJECTIVES

1. To assess if there is any relationship between loans to total asset and profitability of private commercial banks in Ethiopia.
2. To assess if there is any relationship between credit administration (cost per loan) and the profitability of private commercial banks in Ethiopia.
3. To assess if there is any relationship between bank size (economies of scale) and the performance of commercial Banks.
4. To evaluate the impact of macroeconomic factors (GDP & inflation) on private banks profitability in Ethiopia.

1.4. RESEARCH HYPOTHESIS

Like other risks faced by banks, credit risk plays an important role on banks' profitability since a large chunk of banks' revenue accrues from loans from which interest margin is derived (Kolapo, Ayeni & Oke, 2012, p.31). Based on the information I have studied in the previous part, I have realized that it is of great interest to study the relationship between credit risk and profitability of private commercial banks that operate in Ethiopia. Up to the knowledge of the researcher there is no separate studies conducted in public and private commercial banks in Ethiopia in relation to credit risk and bank profitability.

In line with the above definition and its broad purpose statement the following hypotheses were also formulated for investigation.

Null Hypothesis:

HO1: Nonperforming loan Ratio has no significant impact on profitability of private commercial Banks in Ethiopia (NPLR).

HO2: Loan and advance to deposit ratio has no significant impact on profitability of private commercial banks in Ethiopia (LTDR

HO3: Cost per loan asset ratio has no significant impact on profitability of private commercial banks in Ethiopia (CLAR).

HO4: Capital adequacy ratio has no significant impact on profitability of private commercial banks in Ethiopia (CAR).

HO5: Bank size has no significant impact on profitability of private commercial banks in Ethiopia (BS).

HO6: Interest Spread Rate has no significant impact on profitability of private commercial banks of Ethiopia. (IS)

HO7: Inflation has no significant impact on profitability of private commercial banks of Ethiopia (INF).

HO8: Gross domestic product has no significant impact on profitability of private commercial banks of Ethiopia. (GDP)

1.5. SCOPE OF THE STUDY

The study is conducted in all private commercial banks that operate in Ethiopia by taking selected 6sample banks which operate more than sixteen years in banking service. It focuses on the impact of credit risk on profitability of private commercial banks in Ethiopia by categorizing independent factors in to three groups' i.e. bank specific, industry specific and macro-economic factors.

1.6. SIGNIFICANCE OF THE STUDY

The aim of this research is to assess the impact of credit risk on the profitability of Ethiopian private commercial banks over a period of fourteen years (2003-2016).The findings of the research is empowered the management of different private commercial banks of Ethiopia to properly carry out risk management and to know the relationship between credit risk and the profitability of banks then it enables them to reduce losses and increase profitability, to provide policy measures to the various stakeholders to tackle the effect of credit risk in order to enhance the quality of banks' risk assets.

It also provide as a source of literature for other scholars who intend to carry out further research on the impact of credit risk management on profitability with specific reference to banking institutions.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURES

This chapter presents what other scholars have written about the impact of credit risk management in relation to profitability of banks, the variables and methodology they used as well as their findings and recommendations.

What is Risk?

Risk is "the variability of the actual return from the expected returns associate given asset or investment" (Khan and Jain, 2004). Ehrhardt and Brigham (2011) all defined risk as "the chance that some unfavorable event (both financial and physical) will occur".

What is Credit Risk?

Credit risk is a financial exposure resulting from a bank's dependence on another (counterparty) to perform an obligation as agreed (National Bank of Ethiopia, 2010).Credit risk, as defined by the Basel Committee on Banking Supervision (2001), is also the possibility of losing the outstanding loan partially or totally, due to credit events (default risk). It can also be defined as the potential that a contractual party will fail to meet its obligations in accordance with the agreed terms. Credit risk is also variously referred to as default risk, performance risk or counterparty risk (Brown and Moles, 2012).

A bank exists not only to accept deposits but also to grant credit facilities, therefore inevitably exposed to credit risk (Elena Carletti, 2006). Credit risk is by far the most significant risk faced by Banks and the success of their business depends on accurate measurement and efficient management of this risk to a greater extent than any other risks (Gieseche, 2004). (Coyle, 52000) defines credit risk as losses from the refusal or inability of credit customers to pay what is owed in full and on time. Credit risk is the exposure faced by Banks when a borrower (customer) defaults in honoring debt obligations on due date or at maturity. This risk interchangeably called 'counterparty risk' is capable of putting the Bank in distress if not adequately managed. Credit risk management maximizes Bank's risk adjusted rate of return by maintaining credit risk exposure within acceptable limit in order to provide framework for understanding the impact of credit risk management on Banks' profitability (Kargi, 2011).

The main source of credit risk include, limited institutional capacity, inappropriate credit

policies, volatile interest rates, poor management, inappropriate laws, low capital and liquidity levels, direct lending, massive licensing of Banks, poor loan underwriting, laxity in credit assessment, poor lending practices, government interference and inadequate supervision by the central Bank (Kithinji, 2010).Credit risk is critical since the default of a small number of important customers can cause large losses, which can lead to insolvency (Bessis, 2002).

2.1. DEFINITION AND CONCEPT OF CREDIT

Credit is defined as transactions involve in the transfer of money or other property on promise of repayment, usually at a fixed future date. The transferor and transferee will involve in which the former referred us a creditor, and the later as a debtor; hence credit and debt are simply terms describing the same operation viewed from opposite standpoints (Donald, 2008).

Bank credit is related with a loan extended by a bank to an individual, firm or organization, in the form of cash. The type of loan may take several forms from short term loan to a line of credit. The principal function of credit is to transfer property from those who own it to those who wish to use it, as in the granting of loans by banks to individuals and corporate bodies who plan to initiate or expand their business ventures (Bessis J., 2002). The transfer is temporary and is made for a price, known as interest, which varies with the risk involved and also with the demand for, and supply of credit (Stiglitz and Weiss, 1981).

Credit is the confidence of the bank to its customer to give him/her a certain amount, to be used in a particular purpose for a certain period, and payment is made under specific conditions, and provides guarantees for the bank to recover his/her (loan Omra, 2011). The role of banks in general and importance of credit in particular towards economic growth and development of a country is notable. The primarily functions of credit are facilitating transfer of capital or money to where it will be most effectively and efficiently used and economizing the use of currency or coin money as granting of credit has a multiplier effect on the volume of currency or coin in circulation. Credit uses an essential tool like interest and discount rates to control and regulate money in the economy. As it is explained by Al-Zubadi (2002), banking credit is one of the most attractive banking activities for the banks management, but it is also a very sensitive and dangerous, because it is considered as important investment for the commercial banks, may lead the bank to bankruptcy or access to the very high profits. Therefore, in order to avoid any unforeseen risk and so as to satisfy customer's credit demand, banks should strike the balance of demand and supply of credit.

There are three major types of credit. These are commercial credit, consumer credit and investment credit. Commercial credit is a credit availed to a business mainly to cover working capital requirement such as overdraft, loans and advances; trade credit from suppliers; commercial papers (or note); invoice discounting; bill finance; hire purchase; factoring, etc. Consumer credit is a loan availed to an individual for personal use which covers a loan for purchase of household goods, for mortgage loans and automobile loans. Investment credit allows a business concern such as corporate body, sole proprietorship or partnership to obtain credit project loan for capital goods for expansion of factory or procurement of machinery. The tenor of a loan varies from short to medium to long term depending on the institutions, nature and functions, the type of loans availed to the customer (Aremuetal, 2010).

2.2. THEORETICAL FRAMEWORKS

Credit risk is one among many factors with a substantial influence on the stability of a banking system. It is important to measure and control the determinants of the credit risk, especially at the aggregated level by reviewing different theories.

According to Carling, Jacobson et al (2007), macroeconomic variables should be included into credit risk analysis since they have considerable influence on the changes of credit risk at the aggregated level. Negative changes of macroeconomic variables are usually treated as external negative shocks (Delis M., 2008). External negative shock can be interpreted as the negative difference between the real and expected value of macroeconomic parameters. Negative shock can be spurred by the change of any macroeconomic parameter.

2.2.1. LOAN PRICING THEORY

Banks cannot always set high interest rates. Banks should consider the problems of adverse selection and moral hazard since it is very difficult to forecast the borrower type at the start of the banking relationship (Stiglitz and Weiss, 1981). If banks set interest rates too high, they may induce adverse selection problems because high-risk borrowers are willing to accept these high rates. Once these borrowers receive the loans, they may develop moral hazard behavior or so called borrower moral hazard since they are likely to take on highly risky projects or investments (Chodecai, 2004). From the reasoning of Stiglitz and Weiss, specify that in some cases we may not find that the interest rate set by banks is commensurate with the risk of the borrowers.

2.2.2. FIRM CHARACTERISTICS THEORIES

These theories predict that the number of borrowing relationships will be decreasing for small, high-quality, informational opaque and constraint firms, all other things been equal (Godlewski and Ziane, 2008).Robert and Gary (1994) cited in Hamisu (2011), state that the most obvious characteristics of failed banks is not poor operating efficiency, however, but an increased volume of non-performing loans. Non-performing loans in failed banks have typically been associated with regional macroeconomic problems. DeYoung and Whalen (1994) cited in Hamisu (2011) observed that the US Office of the Comptroller of the Currency found the difference between the failed banks and those that remained healthy or recovered from problems was the caliber of management. Superior mangers not only run their banks in a most efficient fashion, and thus generate large profits relative to their peers, but also impose better loan underwriting and monitoring standards than their peers which result in better credit quality.

2.2.3. THEORY OF MULTIPLE-LENDING

It is found in literature that banks should be less inclined to share lending (loan syndication) in the presence of well-developed equity markets. Both outside equity and mergers and acquisitions increase banks' lending capacities, thus reducing their need of greater diversification and monitoring through share lending (Carletti, 2006; Karceski, 2004).

2.2.4. THE SIGNALING ARGUMENTS

The signaling argument states that good companies should provide more collateral so that they can signal to the banks that they are less risky type borrowers and then they are charged lower interest rates. Meanwhile, the reverse signaling argument states that banks only require collateral and or covenants for relatively risky firms that also pay higher interest rates (Chodechai, 2004; Ewert and Schenk, 1998).

2.2.5. CREDIT MARKET THEORY

A model of the neoclassical credit market postulates that the terms of credits clear the market. If collateral and other restrictions (covenants) remain constant, the interest rate is the only price mechanism. With an increasing demand for credit and a given customer supply, the interest rate rises, and vice versa. It is thus believed that the higher the failure risks of the borrower, the higher the interest premium (Ewert, 2000).

The theoretical framework for this study is adapted from (Patnaik and Vasudevan, 1998), which tries to factor the degree of openness of an economy in the analysis of the influence of both internal and external factors on interest rate movements in a semi-open economy like Nigeria. Suppose we have a closed economy, in which there is no inflow or outflow of capital and the demand for money is the demand for real money. In such an economy, money is held by the economic units purely to finance transactions and increase the demand for money with real output.

However, it is worthy of note, that holding money has an opportunity cost that is measured by the nominal rate of interest, with higher interest rates discouraging the holding of wealth in the form of money.

2.3. REVIEW OF EMPIRICAL LITERATURES

This review of the study summarizes various studies conducted in Ethiopia and other countries which is related with banks profitability and credit risk management. The researcher reviewing empirical studies which concluded on the existence of significant impact of credit risk on banks profitability and then reviewing those empirical studies which concluded the existence of positive impact of credit risk management on banks profitability and then later reviewing those studies which shows the negative relationship of credit risk and banks profitability.

At the end researcher has reviewed those empirical studies with the same topic but conducted by taking into consideration external determinants of bank profitability and also studies conducted in Ethiopia as well.

Bourke's (1989) reports on the effect of credit risk on profitability appear clearly negative in Europe, North America and Australia. This result may be explained by taking into account the fact that the more financial institutions are exposed to high risk loans, the higher is the accumulation of unpaid loans, implying that these loan losses have produced lower returns to many commercial Banks in U.S.A (Miller and Noulas, 1997). The findings of Felix and Claudine (2008) also shows that return on equity (ROE) and return on asset (ROA) all indicating profitability were negatively related to the ratio of non-performing loan to total loan (NPL/TL) of financial institutions therefore decreases profitability.

The study conducted with the title of Efficiency of Credit Risk Management on the Performance of Banks in Nigeria A Study of Union Bank PLC (2006-2010) by Rufai (2013) aimed at assessing the efficacy of credit risk management on banks performance and also

to determine if credit risk has effect on the profitability and examining the relationship between interest income and bad debt of the Union Bank. In this study, Return on equity and Return on assets indicates the overall profitability and efficiency while Non-performing loan over total assets shows the level of banks' exposure to credit risk. The study conducted in a population of the twenty-one (21) commercial banks in Nigeria, Secondary sources of data were used for the study. Time series and trend analysis are used for the analysis. Correlation coefficient and regression analysis were used in testing the hypotheses. The study conclude that credit risk affect the performance of Union Bank PLC and that to maintain high interest income, attention needs to be given to credit risk management especially regarding the lending philosophy of Union Bank.

Similarly the study conducted by Awoyemi Samuel Olausi, Banks year 2014 with the title of The Impact of Credit Risk Management on the Commercial Banks Performance in Nigeria by is the study which is made with the objective to investigate the impact of credit risk management on the performance of commercial banks in Nigeria. 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 data used in this study is a financial report of seven commercial banks for seven years (2005 – 2011). The panel regression model was employed for the estimation of the model. The findings revealed that credit risk management has a significant impact on the profitability of commercial banks' in Nigeria. In the same way the study conducted by Taiwoetal in 2013 with a title of Credit Management Spur Higher Profitability? Evidence from Nigerian Banking Sector which evaluates the impact of credit risk management on bank profitability of some selected commercial banks operated in Nigeria.

Credit risk is a serious threat to the performance of Banks; therefore various researchers have examined the impact of credit risk on Banks in varying dimensions. Kargi (2011) evaluated the impact of credit risk on the profitability of Nigerian Banks. Financial ratios as measures of Bank performance and credit risk were collected from the annual reports and accounts of sampled Banks from 2004-2008 and analyzed using descriptive, correlation and regression techniques. The findings revealed that credit risk management has a significant impact on the profitability of Nigerian Banks. The study 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.

Kithinji (2010) assessed 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 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.

Felix and Claudine (2008) investigated the relationship between Bank performance and credit risk management. It could be inferred from their findings that return on equity (ROE) and return on assets (ROA) both measuring profitability were inversely related to the ratio of non-performing loan to total loan of financial institutions thereby leading to a decline in profitability. 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.

Al-Khouri (2011) assessed 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.

Ahmed, Takeda and Shawn (1998) in their study 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 year 2012 the research made in Kenya by Ogilo Fredrick with the title of The Impact Of

Credit Risk Management On Financial Performance Of Commercial Banks In Kenya analyzed the impact of credit risk management on the financial performance of commercial banks and also attempted to establish if there exists any relationship between the credit risk management determinants by use of CAMEL indicators and financial performance of commercial banks in Kenya. The study took an independent variables of: CAMEL components, capital adequacy, asset quality, management efficiency and liquidity and the dependent variable financial performance (ROE).The study took an independent variables of: CAMEL components, capital adequacy, asset quality, management efficiency and liquidity and the dependent variable financial performance (ROE).A causal research design was undertaken in this study and this was facilitated by the use of secondary data which was obtained from the Central Bank of Kenya publications on banking sector survey. The study used multiple regression analysis in the analysis of data and the findings have been presented in the form of tables and regression equations. The study found out that there is a strong impact between the CAMEL components on the financial performance of commercial banks. This study concludes that CAMEL model can be used as a proxy for credit risk management.

Ayadi and Boujelbene (2012) in their Banking performance study of twelve Tunisian deposit Banks over the period of 1995-2005, notice a significant positive relation between size and Return on Average Assets proving the existence of economies of scale in the Tunisian Banking sector. On the contrary, Ben Naceur, and Goaied (2010), show that size impact negatively on profitability which involves that Tunisian Banks operating above their optimum level. Similarly, Sinkey (1991) concludes that larger Banks are more profitable than smaller ones. So, the impact of Bank size on its profitability cannot be theoretically anticipated.

The other study which found the existence of credit risk management on banks profitability is the research conducted by AraHosna et al in year 2009 with the title of Credit Risk Management and Profitability in Commercial Banks in Sweden is tried to find out how the credit risk management affects the profitability of banks. The main purpose of the study was to describe the impact level of credit risk management on profitability in four commercial banks in Sweden. In the model it was defined ROE as profitability indicator while NPLR and CAR as credit risk management indicators. The quantitative method is used in order to fulfill the main purpose of the study. This study used regression model to do the empirical analysis. The data is collected from the sample banks annual reports (2000-2008) and capital adequacy and risk management reports (2007-2008). The findings and analysis reveal that credit risk management has effect on profitability in all 4 banks. Among the two credit risk management indicators, NPLR has a

significant effect than CAR on profitability (ROE).

Similarly, there is a research conducted in year 2012 called Impact of Risk Management on Non-Performing Loans and Profitability of Banking Sector of Pakistan (ShahbazHaneef et-al, 2012).The aim of the study was to investigate the impact of risk management on nonperforming loan and profitability of banking sector of Pakistan. In the model it was defined ROA as profitability indicator while NPLR as credit risk management indicators. Five banks were selected for data collection and whole data was secondary in nature. The result of this study reveals that there is no proper mechanism for risk management in banking sector of Pakistan. Study also concluded that non-performing loans are increasing due to lack of risk management which threatens the profitability of banks.

Studies which support a positive impact of credit risk management on banks profitability, is the study conducted and has a title Impact of Credit Risk Management and Capital Adequacy on the Financial Performance of Commercial Banks in Nigeria (OGBOI, Charles, 2013). This study examined the impact of credit risk management and capital adequacy on banks financial performance in Nigeria. The study used variables of loan loss provisions (LLP), loans and advances (LA), non-performing loans (NPL), capital adequacy (CA) and return on asset (ROA). Panel data model was used to estimate the relationship that exists among variables. Results showed that sound credit risk management and capital adequacy impacted positively on bank's financial performance with the exception of loans and advances which was found to have a negative impact on banks' profitability in the period under study.

NevineSobhy Abdel Megeid, 2013 with a title of the impact of effective credit risk management on commercial banks liquidity performance: Case of Egypt was made. This study was conducted to examine the impact of bank's credit risk management on improving liquidity performance, in the Egyptian commercial banks. The study selects and took a sample of 8 Egyptian commercial banks. The research is done on the financial statements analysis for the period 2004-2010, based on Bank scope database. The researcher uses Panel data analysis using Stata, where data are collected over 7 years and over the same sample, then a regression is run over these two dimensions (cross-sectional time series).The study found the significant and positive relationship between effective credit risk management and improving liquidity levels in Egypt commercial banks.

There is also a study called Credit Risk and Profitability of Selected Banks in Ghana which is conducted by Samuel Hymoreet'al in 2012.This study attempts to reveal the relationship

between credit risk and profitability of some selected banks in Ghana. The dependent variable in the model is return on equity while the explanatory variable is credit risk which is measured by three main variables- net charge off to total loans and advances, non-performing loans to total loans and advances and pre-provision profit to total loans and advances. The researcher also controlled for the effects of other factors on firm profitability. These include bank size, bank growth rate and the choice of capital structure. A panel data from six selected commercial banks covering the five-year period (2005-2009) was analyzed within the fixed effects framework. From the results credit risk (non-performing loan rate, net charge-off rate, and the pre-provision profit as a percentage of net total loans and advances) has a positive and significant relationship with bank profitability.

Moreover the study titled Credit Risk Management and Profitability of Selected Rural Banks in Ghana (Harrison Owusu AFRIYIE, 2013). This study examines the impact of credit risk management on the profitability of rural and community banks in the BrongAhafo Region of Ghana. In the model, definition of Return on Equity (ROE) and Return on Asset (ROA) were used as profitability indicator while Non-Performing Loans Ratio (NLPR) and Capital Adequacy Ratio (CAR) as credit risk management indicators. The data used for analysis, ten rural banks financial statements from the period of 2006 to 2010 (five years). The panel regression model was employed for the estimation. The findings indicate a significant positive relationship between non-performing loans and rural banks' profitability revealing that, there are higher loan losses but banks still earn profit.

To the contrary of the above studies, there are studies which concluded a negative relationship between credit risk management and banks profitability. One of them is the study conducted by Danson Musyoki in 2011 with the title of the impact of credit risk management on the financial performance of banks in Kenya for the period 2000-2006.The objective of study was to assess various parameters pertinent to credit risk management as it affects banks' financial performance. The Return on Assets (ROA) is a ratio that measures company earnings before interest & taxes (EBIT) against its total net assets. The ratio is considered an indicator of how efficient a company is using its assets to generate before contractual obligation must be paid. It is calculated as: ROA= EBIT/Total Assets. Return on assets gives an indication of the capital intensity of the banking industry, which will depend on the industry; banks that require large initial investment will generally have lower return on assets (Apps, 1996).Parameters covered in the study were; default rate, bad debts costs and cost per loan asset. The study employed simple random sampling in order to pick 10 banks. Financial reports of 10 banks was used to analyze

profit ability ratio for seven years (2000-2006) comparing the profitability ratio to default rate, cost of debt collection an cost per loan asset which was presented in descriptive, regression and correlation was used to analyze the data. The study revealed that all these parameters have an inverse impact on banks' financial performance, however the default rate is the most predictor of bank financial performance vis-à-vis the other indicators of credit risk management.

Hosna et al. (2009) also found a similar result with Poudel in his study of four Swedish banks covering a period of 2000 to 2008. The result showed that rate of non-performing loan and capital adequacy ratios was inversely related to ROE though the degrees vary from one bank to the other. Such inverse relationships between profitability, performance and credit risk measures were also found in other studies (Achou and Tenguh, 2008; Funso et al., 2012; Musyoki and Kadubo, Tomak (2013) conducted study on the "Determinants of Bank's Lending Behavior of commercial banks in Turkish" for a sample of eighteen from 25 banks. The main objective of the study was to identify the determinants of bank`s lending behavior. The data was covered2003 to 2012 periods. The variables used were size, access to long term funds, interest rates, GDP growth rate and inflation rate. The finding reveals that bank size, access to long term loan and inflation rate have significant positive impact on the bank`s lending behavior but, interest rates and GDP are insignificant.

A survey study by the National Bank of Ethiopia (NBE) (2009), presented that irrespective of the strengths by Ethiopian commercial banks in the management of risks, weaknesses dominate Ethiopian commercial banking sector risk management.

Mekasha (2011) studied credit risk and its impact on the performance of a sample of six Ethiopian commercial banks using return on asset as a surrogate of performance and nonperforming loan to total loan ratio, loan provisions to nonperforming loan ratio, loan provision to total loan ratio and loan provision to total assets ratio used as a surrogate of credit risk measures. The result revealed that nonperforming loan to total loan ratio and loan provision to total loan ratio have inverse relationship with return on asset but only nonperforming loan to total loan was statistically significant. Whereas loan provision to nonperforming loan and loan provision to total asset have positive association with return on asset but both are insignificant to impact return on asset.

Awoke (2014) conducted a study on the impact of credit risk on the performance of samples of eight commercial banks in Ethiopia over the period of years 2008-2012 using return on asset as dependent variable and provision to total loans, loans to total assets, cost to total loans

and natural logarithm of total asset as independent variables. The findings shown that provisions to total loans and cost to total loans have inverse association with return on asset but loans to total assets and the natural logarithm of total assets have positive association with return on asset and all variables have significant impact on return on asset.

Bizuayehu (2015) carried out a study on the impact of credit risk on the financial performance of banks in Ethiopia using bank specific and macroeconomic factors covering a period of years 2003 -2008. Return on equity used as a proxy for financial performance and nonperforming loan to total loan ratio, capital adequacy ratio and total loan to deposit ratio, bank size, interest rate spread, gross domestic product and inflation rate as a proxy for credit risk. The study revealed that both bank specific factors and macroeconomic factors have inverse association with return on equity but only the bank specific factors are significant factors influencing return on equity.

Gizaw, Kebede and Selvaraj (2015) evaluated the impact of credit risk on the performance of commercial banks in Ethiopia over a period of years 2003-2004. Return on asset and return on equity used as proxy of performance and nonperforming loan to total loan ratio, capital adequacy ratio, and loan and advance to deposit ratio and loan loss provision to total loan ratio were used as a proxy for credit risk. The findings revealed that non-performing loan to total loan and loan and advances to deposit have inverse association with return on asset while the other two have positive association with return on asset. However; only nonperforming loan to total loan and loan loss provision to total loan are statistically significant to impact return on asset. Further, the study revealed that except loan loss provision to total loan ratio all the proxies of credit risk have inverse relationship with return on equity and all are significant factors impacting return on equity.

The research by 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 empirical investigation uses the accounting measure return on assets (ROA) to represent Banks' performance. The study finds that bank specific variables by large explain the variation in profitability. High performance is related to the ability of banks to control their credit risk, diversify their income sources by incorporating non -traditional banking services and control their overhead expenses. In addition, the paper finds that bank's capital and liquidity status are not significant to affect the performance of banks. On the other hand, the paper finds that bank size and 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

Finally the researcher tried to find studies which are conducted in Ethiopia and to the best knowledge of the researcher studies on the relationship between credit risk and profitability performance of Ethiopian commercial banks are few. Of these studies, Tefera (2011) and Mekasha (2011) each studied the effect of credit risk management on the performance of commercial banks in Ethiopia. Both used secondary data from annual reports of commercial banks and survey of primary data from bank managers and officers which similarly 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.

To sum up, to the best of the researcher's understanding, Mekasha (2011), Awoke (2014), Bizuayehu (2015) and Gizaw, Kebede and Selvaraj (2015) are the only studies carried out in Ethiopia's commercial banking sector context entitled as the impact of credit risk management on the financial performance of Ethiopian commercial banks till this research is in effect. Even though the studies have attempted to contribute to the existing literature in some way, they are still a gap especially in private banks. Therefore, there is a need to study the impact of credit risk management on the financial performance of Ethiopian private commercial banks. As a result, the current study shades the gap in the literature by employing alternative econometric models. Therefore, the main purpose of this research is in order to examine the impact of credit risk measures capital adequacy ratio, nonperforming ratio, loan to deposit ratio, inflation, interest spread, real growth domestic product and bank size on measures of financial performance return on equity.

2.4. BANK'S PERFORMANCE

The role of Bank remains central in financing economic activity and its effectiveness could exert positive impact on overall economy as a sound and profitable. Banking sector is better able to withstand negative shocks and contribute to the stability of the financial system (Athanasoglou et al, 2005). Therefore, the determinant of Bank performance have attracted the interest of academic research as well as of Bank management, financial markets and Bank supervisors since the knowledge of the internal and external determinants of Banks' profits and margins is essential for various parties.

Most researchers have measured performance using either Return on Equity (ROE) or Return on Assets (ROA).The major studies dealing with micro-specific factors employ variables such as size, risk, capital adequacy and operational efficiency and test the relationship with either Return on Equity (ROE) or Return on Assets (ROA).

Return on asset tells how the assets of the firm are used most effectively to earn profit. Return on assets is an indicator of how profitable a company is before leverage, and is compared with companies in the same industry. Since the figure for total assets of the company depends on the carrying value of the assets, some caution is required for companies whose carrying value may not correspond to the actual market value.

Return on assets (ROA) is a common figure used for comparing performance of financial institutions (such as banks), because the majority of their assets will have a carrying value that is close to their actual market value. Return on asset is not useful for comparisons between industries because of factors of scale and peculiar capital requirements (such as reserve requirements in the insurance and banking industries) (Philip Kofler, 2005).

Return on equity (ROE) is a ratio measuring stockholders' (shareholders') profitability, expressed as a percentage of the firm's net worth. ROE indicates a firm's efficiency in applying common-stockholders' (ordinary-shareholders') money. Formula: Net income ÷ Net worth. It measures a firm's efficiency at generating profits from every unit of shareholders' equity (also known as net assets or assets minus liabilities).

Widely used by investors, the ROE ratio is an important measure of a company's earnings performance. The ROE tells common shareholders how effectively their money is being employed. Peer Company, industry and overall market comparisons are appropriate; however, it should be recognized that there are variations in ROEs among some types of businesses. In general, financial analysts consider return on equity ratios in the 15-20% range as representing attractive levels of investment quality (Richard, 2015).

Turning to the external determinants several factors have been suggested as impacting on profitability and these factors can further distinguish between control variables that describe the macroeconomic environment, such as inflation, interest rates and cyclical output, and variables that represent market characteristics. The latter refer to market concentration, industry size and ownership status (Athanasoglou et al, 2005).

Market Risk is the risk of asset value change associated with systematic factor. According to Santomero (1997), market risk by its nature can be hedged but cannot be diversified away completely. Two market risks that are of concern to the Banking sector are interest rates and relative value of currencies. The Banking operation is solely dependent on these as it impacts on performance. For instance most Banks track interest rate risk closely. They measure and manage the firm's vulnerability to interest rate variation as well. Liquidity Risk, according to Santomero (1997), can be described as the risk of a funding crisis, such as unexpected event in the form of large charge off, loss of confidence, or a crisis of national proportion like existence crisis. Risk management here centers on liquidity facilities and portfolio structure. Recognizing liquidity risk leads the Banks to recognize liquidity itself as an asset, and portfolio design in the face of illiquidity concerns as a challenge.

There is wide variety of literature support the impact of the macroeconomic factors impact on bank performance. The macroeconomic policy stability, Gross Domestic Product, Inflation, Interest Rate and Political instability are also other macroeconomic variables that affect the performances of banks.

2.5. CONCEPTUAL FRAMEWORK

The main objective of this study is to examine the impact of Credit risk management of banks on profitability. Based on the objective of the study, the following conceptual model is framed. As it described previously in the related literature review parts, bank profitability can be affected by bank specific, industry specific or macroeconomic factors. Bank specific factors are: non-performing loans overt total loan, capital adequacy ratio, bank size, and Loan-deposit.

In addition to this there are also macroeconomic factors which can affect bank profitability such as economic growth which is measured by GDP and inflation. For this study the researcher also took interest spread rate from the industry specific as this rate will going to determine partially by the government and also the market rate. Thus, the following conceptual model is framed to summarize the main focus and scope of this study in terms of variables included.

2.6. SUMMARY AND KNOWLEDGE GAP

Up to the best knowledge of the researcher, in Ethiopia context it's not possible to get a study which took; bank specific, industry specific and macro-economic factors to test the impact of credit risk management on financial performance of banks in Ethiopia. The current study therefore aimed at contributing to the literature gap on the subject matter by expanding the independent variables and also taking into consideration of the external determinants of

profitability factors like interest spread, inflation and GDP. This study is conducted first by considering both internal and external factors and analyzes the impact of those variables on banks profitability. This enables the researcher to evaluate from different three directions and to examine the impact of credit risk management on profitability of Ethiopian banks.

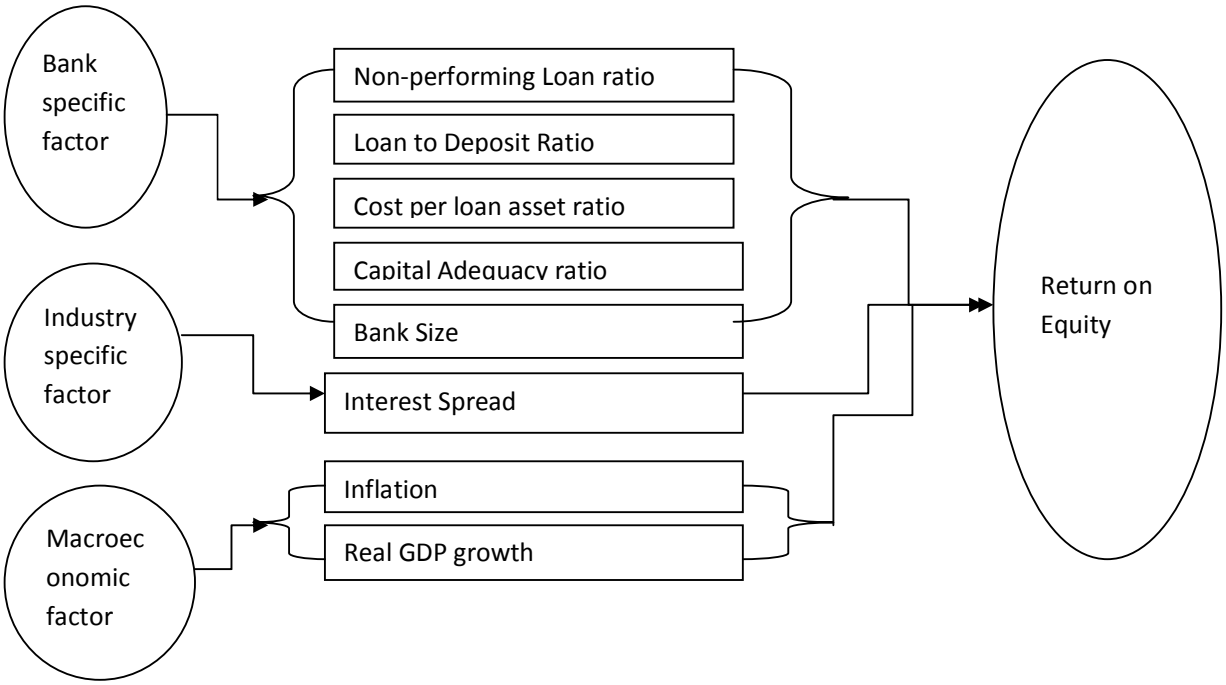


Fig 2.1 Theoretical/Conceptual framework

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

INTRODUCTION

This chapter contains the research methodology to be employed in order to address the research objective. It gives a detailed schema on the procedures the researcher pursues to conduct this research. It presents the research approach, source & type of data, sampling design and techniques, data collection method, method of data analysis and presentation, variable definition and model specification.

3.1. RESEARCH DESIGN

Many research designs could be used to study business problems (Hair et al., 2011). Depending on the way in which researchers ask their research questions and present their purpose, the research design could be classified into three groups, namely exploratory, descriptive and explanatory studies (Saunders et al., 2009, p. 138& 139). For this study descriptive research design is used.

As to the descriptive studies, they are designed to obtain data that describe the characteristics of the topic of interest in the research (Hair et al., 2011, p.148). The objective of descriptive study is to represent an accurate profile of persons, events or situations (Robson, 2002, cited in Saunders et al., p. 140). In descriptive research, the research problem is structured and well understood (Ghauri and Grønhaug, 2005, p. 58).Saunders et al. (2009) expanded the idea like "it is necessary to have a clear picture of the phenomena on which you wish to collect data prior to the collection of data." Compared with exploratory study, descriptive study would give the readers comforter answer addressed to the research question. In other words, it is used for testing hypothesis (Hair et al., 2011, p.149).

As stated above, the objective of this study is to investigate the impact of credit risk on profitability of private commercial banks in Ethiopia. In order to achieve this objective, this study employed descriptive research design.

3.2. SOURCE AND TYPE OF DATA

This research is done exclusively based on secondary data. The required secondary data is obtained from annual financial statements of sample private commercial banks in Ethiopia, NBE report, and NBE web resources. In order to enhance the accuracy of data to be used in the analysis, data pertinent to annual profit, loan portfolio, deposit, equity, asset and non- performing loan are collected from the audited financial statements of the sample commercial banks.

3.3. SAMPLING DESIGN AND TECHNIQUES

There are 16 private commercial banks operating in the country as of June 2016. From the 16 commercial banks, a sample of 6 banks is selected for this study using purposive sampling technique. Purposive sampling is the deliberate choice of a respondent/unit due to the qualities the individual/entity possesses (Tongco, 2007 cited in Addaeetal. 2014). The technique was applied to the study to select the sample in view of the fact that, the commercial banks to be included in the sample should be those which has been in operation for the past 16 years. The list of all commercial banks (Population) with the year of their establishment is indicated in Appendix 1.

Accordingly, six private commercial banks are included in the sample; based on the stated purpose and selection criteria. The sample constitutes 38% of the total population of private commercial banks operating in Ethiopia. Thus the sample size determined can fairly represent the population and the researcher.

3.4. DATA COLLECTION METHOD

Financial figures of the sample private commercial banks for the study period (20003-2016) is collected from NBE report organized from audited financial statements of each sample private commercial banks annual return.

3.5. METHODS OF DATA ANALYSIS

The researcher analyzed the data collected from secondary sources by using regression and correlation analysis method. By clearly identifying the dependent and the independent variables, the researcher is used multiple regression model to show the relationship between the dependent and independent variables by using EViews 7 and interpret the outputs through charts, tabular and graphics.

3.6. MODEL SPECIFICATION

The key aim of this study is to observe the impact of credit risk on profitability of private commercial Banks in Ethiopia. Analogous to previous research works conducted on the impact of credit risk on banks profitability, this study used Return on Equity (ROE) as dependent variables whereas Non-performing Loan (NPL) Ratio, Bank Size, Capital Adequacy ratio, Loan to Deposit ratio, Cost per loan asset ratio, Interest spread rate, GDP and inflation rate are used as an explanatory variables. These variables are chosen since they are widely existent for the private commercial bank in Ethiopia. So, this study examined the impact of credit risk by testing those listed variables on Banks profitability of private commercial banks that operate in Ethiopia by adopting a model that is existed in most literatures.

The data used to study enabled the researcher to use a panel/longitudinal data model which is deemed to have advantages over cross sectional and time series data methodology. Panel data involves the pooling of observations on the cross-sectional over several time periods. As Brook (2008) stated the advantages of using panel data set; first and perhaps most importantly, it can address a broader range of issues and tackle more complex problems with panel data than would be possible with pure time series or pure cross- sectional data alone.

$$Yit = \alpha + \beta xit + \mu it$$

Where;

i denote the cross section,

t denotes the time series dimension,

yit is the dependent variable,

α the intercept'

β is the parameter to determine the independent variable,

xit is observations in independent variable,

μit is error term

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

$$ROEi, t = \alpha + \beta 1NPLRi, t + \beta 2CARi, t + \beta 3LTDRi, t + \beta 4CLARi, t + \beta 5BSi, t + \beta 6IS, t + \beta 7GDPi, t + \beta 8INF, t + ui, t$$

Where;

$ROEi, t$ =Return on Equity of i^{th} bank at year **t,**

NPLRi, t =Nonperforming loan ratio of i^{th} bank at year **t**,

CARi, t =Capital Adequacy Ratio of i^{th} bank at year **t,**

LTDRi, t =Loan to Deposit Ratio of i^{th} bank at year **t**,

CLARi, t =cost per loan ratio of i^{th} bank at year **t**,

BS i, t=Bank Size of i^{th} bank at year t,

IS, t =the average Interest rate Spread of banks at year **t,**

GDPi, **t** =Gross Domestic product of the country at year **t,**

INFt =inflation rate of the country at year t,

Various diagnostic tests such as normality, heteroscedasticity, autocorrelation and multicolinearity test is conducted to decide whether the model proposed in the study is appropriate and fulfill the assumption of classical linear regression model (CLRM). These tests are presented below.

NORMALITY TEST:

The Classical Linear Regression Model (CLRM) assumes that the error term is normally distributed with the mean of error being zero as positive error will offset the negative error. The normality of error term can be examined through informal way which is using the graph to detect the pattern of the residual or the formal way is the Jarque-Bera test statistics.

The Jarque-Bera test statistics requires the value of skewness and kurtosis in the model in order to calculate the Jarque-Bera test statistics value. Other than that, the researchers also can use Jarque-Bera p-value to determine the result.

In null hypothesis, the assumption will be the error term is normally distributed. So, if the p value of JB-statistic is greater than α=0.05, we should not reject the null hypothesis.

HETEROSCEDASTICITY:

Heteroscedasticity is the econometric problem where there is omission of reasonable independent variable that originally should be included into the model. It occurs when the variance of error term is not constant across the number of observations. The researchers have to make sure that the model is free from heteroscedasticity to obtain a precise and interpretable result. A hypothesis test is carried out using Eview 7 with Breusch-Pagan test and p-value is obtained to detect the heteroscedasticity problem. If the obtained p-value more than 5% significance level, it implies that the model does not have heteroscedasticity problem.

AUTOCORRELATION:

Autocorrelation, also known a serial correlation or cross-autocorrelation, is the cross-correlation of a signal with itself at different points in time (that is what the cross stands for). Informally, it is the similarity between observations as a function of the time lag between them. It is a mathematical tool for finding repeating patterns, such as the presence of a periodic signal obscured by noise, or identifying the missing fundamental frequency in a signal implied by its harmonic frequencies. It is often used in signal processing for analyzing functions or series of values, such as time domain signals.

Autocorrelation problem will occur when error term at the period t is correlated with the error term at period before t. Autocorrelation is most likely to happen in the time series data due to the importance of the sequence of the time period.

In this research The Breusch–Godfrey serial correlation LM test is used to test autocorrelation. It is a test for autocorrelation in the errors in a regression model. It makes use of the residuals from the model being considered in a regression analysis, and a test statistic is derived from these. The null hypothesis is that there is no serial correlation of any order up to p.

The test is more general than the Durbin–Watson statistic (or Durbin's h statistic), which is only valid for non-stochastic repressors and for testing the possibility of a first-order autoregressive model for the regression errors. The BG test has none of these restrictions, and is statistically more powerful than Durbin's statistic.

MULTICOLLINEARITY:

Multicollinearity (also co linearity) is a phenomenon in which two or more predictor variables in a multiple regression model are highly correlated, meaning that one can be linearly predicted from the others with a non-trivial degree of accuracy. In this situation the coefficient estimates of the multiple regressions may change erratically in response to small changes in the model or the data. multicollinearity does not reduce the predictive power or reliability of the model as a whole, at least within the sample data set; it only affects calculations regarding individual predictors. That is, a multiple regression model with correlated predictors can indicate how well the entire bundle of predictors predicts the outcome variable, but it may not give valid results about any individual predictor, or about which predictors are redundant with respect to others.

There are various methods to detect multicollinearity. Firstly, by comparing the expected sign of independent variables obtained from the model with prior expectation. It is possible that multicollinearity problem exists in the model if the expected sign for independent variable is inconsistent with theory or prior expectation. Secondly, by examining the correlation matrix provided by Views 7. If the researchers found that there is any correlation between two variables to be more than 80%, automatically the suspicions for the existence of muliticolinearity problem is derived. Besides, multicollinearity problem can be detected by viewing the estimated model has high R-square but with only few or no independent variables found to have significant effect on the dependent variable besides there is high-pair wise correlation between two independent variables.

R-SQUARED:

R-Squared, also known as coefficient of determination which is a statistical term saying how good one term is at predicting another. The higher the value of R-Square, the better is the prediction of one term from another said by Cameron, & Windmeijer (1996).

3.7. STUDY VARIABLES

Profitability is dependent variables used in this study. It is measured in terms of ROE. Besides, explanatory variables included in this study are NPLR, Bank size, Capital Adequacy and Loan and advance to deposit ratio, Cost per loan asset ratio are those from the bank specific factors, Interest Spread from industry specific and GDP with inflation from the macroeconomic factors.

3.7.1. DEPENDENT VARIABLE

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.

3.7.1.1. RETURN ON EQUITY

It is a ratio measuring stockholders' (shareholders') profitability, expressed as a percentage of the firm's net worth. ROE indicates a firm's efficiency in applying common-stockholders' (ordinary-shareholders') money. Formula: Net income ÷ Net worth. It measures a firm's efficiency at generating profits from every unit of shareholders' equity (also known as net assets or assets minus liabilities).

Widely used by investors, the ROE ratio is an important measure of a company's earnings performance. The ROE tells common shareholders how effectively their money is being employed. Peer Company, industry and overall market comparisons are appropriate; however, it should be recognized that there are variations in ROEs among some types of businesses. In general, financial analysts consider return on equity ratios in the 15-20% range as representing attractive levels of investment quality (Richard, 2015).

$$Returnon\ Equity = \frac{Net\ Incom}{Shareholder's\ Equity}$$

Net income is for the full fiscal year (Before dividends paid to common stock holders but after dividends to preferred stock) Shareholder's equity does not include preferred shares.

3.7.1.2. RELATIONSHIP BETWEEN CREDIT RISK MANAGEMENT & BANK PERFORMANCE

Return on Equity (ROE) is commonly used to measure the profitability of banks. The efficiency of the banks can be evaluated by applying ROE, since it shows that banks reinvest its earnings to generate future profit. The growth of ROE may also depend on the capitalization of the banks and operating profit margin. If a bank is highly capitalized through the risk weighted capital adequacy ratio (RWCAR) or Tier 1 capital adequacy ratio (CAR), the expansion of ROE will be retarded. However, the increase of the operating margin can smoothly enhance the ROE.
It is measured by the ratio of net profit to total equity.

$$ROE = \frac{Net\ Profit}{Total\ Equity}$$

3.7.2. INDEPENDENT VARIABLES

3.7.2.1. NONPERFORMING LOAN RATIO (NPLR)

Non-performing loan is a probability of loss which requires provision. The amount of provision is "accounting amount" which can be further subtracted from the profit. Thus high NPL increases the provision while reduces the profit.

Non-performing loan over total assets shows the level of banks' exposure to credit risk. If the ratio goes above 25%, is an indication that the bank is getting into the zone of weak credit risk control system (Agborade 2002).

Deterioration of asset quality 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 non-performing loan that can seriously damage a banks' financial adverse effect position banks operation having (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.

$$NPLR = \frac{NPL}{Total\ Loan}$$

3.7.2.2. CAPITALADEQUACY RATIO (CAR)

Capital adequacy ratio is the proportion of a bank's own equity in relation to its risk exposure. It helps to protect depositors from banks who lend aggressively and in doing so do not get back most of the money lent. This is because when a bank makes large loan losses that wipe out its total equity, it may lead to an immediate bankruptcy hence making depositors lose their money.

NBE has set specific measure of the capital adequacy position of Banks, which is the ratio the Capital Adequacy Ratio (CAR) (Directive No. SBB/9/95). The directive clearly set out the computation mechanism and the conversion factors for both on and off-balance sheet items and strictly set for all banks not to maintain their capital level below 8% of their risk weighted assets. Irrespective of such regulatory framework, the main intention of holding capital is to build the internal strength of the bank to withstand losses during crisis (Dang, 2011).

The research of Boudriga, Taktak & Jellouli (2009) illustrates this research found that CAR seems to reduce the level of problem loans which means higher CAR leads to less credit exposures. However, Rime (2001) observed a positive relationship in his research between bank risk and capital ratio of Swiss banks during the period 1989-1995. Goddard et al. (2004) study the influential factors of profitability of banks in Europe. They found a positive relationship between the CAR (bank capital and reserves to total assets) (The World Bank, 2014) and profitability. And Samy and Magda (2009) investigate the effects of capital regulations on the performance of banks in Egypt. The research provides a comprehensive framework to measure the impact of capital adequacy on two indicators of bank performance: cost of intermediation and profitability. The result of the research indicates that higher capital adequacy "increase the interest of shareholders in managing bank's portfolio" which generates "higher cost of intermediation and profitability" (Samy and Magda, 2009, p. 70).

It is a measure of bank`s financial strength since it shows the ability to withstand/ tolerate with operational and abnormal losses. It also represents the ability to undertake additional business (Habtamu, 2012). As noted by Makri et al. (2014), CAR determines risk behavior of banks. It is a measure of banks solvency and ability to absorb risk. Thus, this ratio is used to protect depositors and promote stability and efficiency of financial systems. It is measured by total Equity to total asset ratio.

The ratio of equity to total assets is considered one of the basic ratios for capital strength. It is expected that the higher this ratio, the lower the need for external funding and the higher the profitability of the bank. It shows the ability of bank to absorb losses and handle risk exposure with shareholder. Equity to total assets ratio is expected to have positive relation with performance that well-capitalized banks face lower costs of going bankrupt which reduces their costs of funding and risks (Berger, 1995; Bourke, 1989; Hassan and Bashir, 2003).

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

3.7.2.3. LOAN AND ADVANCE TO DEPOSIT RATIO (LTDR)

This is the ratio of banks total loans to total deposits. If the ratio is lower than 1, the bank relied on its own deposits to make loans to its customers without any outside borrowing. On the contrary, if the ratio is greater than 1, the bank borrowed money at higher rates. Banks may not be earning an optimal return if the ratio is too low. If the ratio is too high, the banks might not have enough liquidity to cover any unforeseen funding requirements or economic crises. It is a commonly used statistic for assessing a bank's liquidity.

The formula for the loan to deposit ratio is exactly as its name implies, loans divided by deposits. The loan to deposit ratio is used to calculate a lending institution's ability to cover withdrawals made by its customers. A lending institution that accepts deposits must have a certain measure of liquidity to maintain its normal daily operations. Loans given to its customers are mostly not considered liquid meaning that they are investments over a longer period of time. Although a bank will keep a certain level of mandatory reserves, they may also choose to keep a percentage of their non-lending investing in short term securities to ensure that any monies needed can be accessed in the short term.

To quantify banks liquidity, this research paper employed Loan to Deposit Ratio. Which indicates that the ability of banks to withstand deposit withdrawals and willingness of banks to meet loan demand by reducing their cash assets. When the banks are more liquid, they can reduce risk of insolvency. This ratio provides more general information on the issue deposit because it takes no account the mix between time and demand deposit, and other issues.

$$LTDR = \frac{Total\ Loan\ and\ Advancce}{Total\ Deposit}$$

3.7.2.4. BANK (BS) SIZE

Bank size (LOGTA) is generally used to capture potential economies or diseconomies of scale in the banking sector. This variable controls for cost differences in product and risk diversification according to the size of the financial institution. The first factor could lead to a positive relationship between size and bank profitability, if there are significant economies of scale (Akhavein et al. 1997; Bourke 1989; Molyneux and Thornton 1992; Bikker and Hu 2002; Goddard et al. 2004), while the second to a negative one, if increased diversification leads to lower credit risk and thus lower returns. Other researchers however conclude that marginal cost savings can be achieved by increasing the size of the banking firm, especially as markets develop (Berger et al. 1987; Boyd and Runkle 1993; Miller and Noulas 1997; Athanasoglou et al. 2007).

Eichengreen and Gibson (2001) suggest that the effect of a growing bank's size on profitability may be positive up to a certain limit. Beyond this point the effect of size could be negative due to bureaucratic and other reasons. Hence, the size-profitability relationship may be expected to be non-linear.

The theoretical arguments suggest that bank size and bank risk taking variables has a negative relationship. Such a relationship is justified by the most natural argument that is diversification by size. Naturally, larger banks are expected to have lower risks because they have the capability of holding more diversifiable portfolios. In this respect, many researchers have been conducted. According to the researches of Saunders et al. (1990), Chen et al. (1998), Cebenoyan et al. (1999) and Megginson (2005), there is a negative relationship between bank risk and bank size. They explain this result by the fact that larger banks are likely to be more skilled in risk management and have also better diversification opportunities. This is included to control for the possibility that large banks are likely to have greater product and loan diversification. So, we expect to find that the bank size is negatively related to the level of risk.

The impact of bank size on profitability is uncertain a prior for the fact that on the one hand, increased diversification implies less risk and hence a lower required return, and on the other hand, bank size takes into account differences brought about by size such as economies of scale. For large firms their size permits them to bargain more effectively, administer prices and in the end realize significant higher prices for the particular product, (Agu, 1992).

In most finance literature, total assets of the banks are used as a proxy for bank size. Bank size is represented by natural logarithm of total asset (LNTA). The effect of bank size on profitability is generally expected to be positive (Smirlock, 1985).

$$BankSize = LN(TA)$$

3.7.2.5. COST PER LOAN ASSET RATIO (CLAR)

Many researchers include operational efficiency as a specific-Bank factor affecting their profitability. Theoretically more operational efficient Bank is expected to be more profitable. Cost per loan asset (CLA) is the average cost per loan advanced to customer in monetary term. Purpose of this is to indicate efficiency in distributing loans to customers (Appa, 1996). CLA ratio can be calculated as: CLA Ratio= Total Operating Cost/ Total amount of loans.

However, measured by the cost-income ratio or by overhead costs to total assets ratio, some empirical literature found a negative relationship between operational efficiency and Bank's profitability (Athanasoglou et al., 2008; Goddard et al., 2009). Others authors, show a positive relationship between profitability and expenses. Molyneux and Thornton (1992) provide the evidence that Bank's expenses affect positively the European Banking profitability. Their results defend the efficiency wage theory, which states that employee's productivity increases with the wage's rate. Similarly, Guru et al. (2002) and BenNaceur (2003), suggest that Banks are able to pass their overheads to depositors and borrowers in terms of lower deposit rates and/or larger lending assets. Nevertheless, BenNaceur and Omra (2011) on MENA countries, find the opposite results when they consider the total operating costs divided by the sum of total earning assets and total deposits as a proxy of operational efficiency.

$$CLAR = \frac{Total\ Operating\ Cost}{Total\ amount\ of\ lans}$$

3.7.2.6. 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.

3.7.2.7. GROSSDOMESTIC PRODUCT (GDP)

The real GDP is the sum of the value added in the economy during a given period or the sum of incomes in the economy during a given period adjusted for the effect of increasing prices (Daferighe & Aje, 2009). Nominal GDP is the determination of GDP without taking into account other factors or variables such as inflation (Business Dictionary, 2013). Nominal GDP increases overtime for two reasons (Daferighe & Aje, 2009). The first is that the production of most goods increases overtime. The second is that the naira price of most goods increases overtime.

Two different approaches are used to calculate GDP. In theory, the amount spent for goods and services should be equal to the income paid to produce the goods and services, and other costs associated with those goods and services. Calculating GDP by adding up expenditures is called the expenditure approach, and computing GDP by examining income for resources (sometimes referred to as gross domestic income, or GDI, is known as the resource cost/income approach.

Most of the studies under review use GDP growth rates as the main indicator of macroeconomic conditions and debt sustainability of wide group of borrowers. An increase in GDP growth rates translates into higher income and improves debt servicing capacity of borrowers, which results in lower credit risk of banks (Anna, 2013).

3.7.2.8. INFLATION (INF)

The effect of inflation is also another important determinant of banking performance, but its impact is not clear. Higher inflation can make debt servicing easier by reducing the real value of outstanding loans. However, it can also weaken borrowers' ability to service debt by reducing their real income. Therefore, the relationship between inflation and credit risk can be positive or negative.

High inflation rates are generally associated with a high loan interest rate. Thus, high interest rate increases cost of borrowing, which leads to an increase in the obligation of borrowers resulting in an increase in the credit risk (Ravi, 2013).

The inflation rate is widely calculated by calculating the movement or change in a price index, usually the consumer price index. The inflation rate is the percentage rate of change of a price index over time. The Retail Prices Index is also a measure of inflation that is commonly used in the United Kingdom. It is broader than the CPI and contains a larger basket of goods and services (Olivier, 2000).

In general, high inflation rates are associated with high loan interest rates and thus high income. Perry (1992), however, asserts that the effect of inflation on banking performance depends on whether inflation is anticipated or unanticipated. Athanasoglou et al., 2005, state in relation to the Greek situation that the relationship between inflation level and banks profitability is remained to be debatable. The direction of the relationship is not clear (Vong and Chan, 2009).

Moreover, macroeconomic indicators can also influence bank risks. These indicators are those at the origin of banking crises: inflation rate of growth GDP, interest rate and exchange rate. In this setting, many researchers have been conducted to analysis the relationship between these indicators and the occurrence of banking crises. The findings in this respect indicate that there is a close relationship between macroeconomic indicators and banking crises and excessive risk (Angeloni and al (2009), Olga Bohachova (2008), Buch and al (2010). We will test if these variables influence the levels of credit risk in the Tunisian context.

CHAPTER FOUR

4. DATA ANALYSES AND DISCUSSION OF RESULTS

Introduction

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

This chapter has five sections. In the first section 4.1, the descriptive statistics of the data has been described very well, in section 4.2 correlation analysis had been conducted, and under section 4.3 the test for the classical liner regression model/CLRM are presented. Then, the results of the regression model analysis were presented how they explained variable affect the explanatory variable under section 4.4. At the end, discussions for the results of the regression analysis were made under section 4.5.

4.1. DESCRIPTIVE STATISTICS

The descriptive statistics for the dependent and independent variables for mean, median, standard deviation, minimum and maximum values and number of observation are presented below. The explained variable is financial performance measured by Return on Equity parameter and others are the explanatory variables. They are: Nonperforming Loan Ratio, Loan to Deposit ratio, Cost to Loan Asset Ratio, Interest spread, Inflation, Capital Adequacy, Bank Size, ,and real GDP growth. To show the brief overview of the data, I present the following Table 4.1 which contains the descriptive statistics of variables of private commercial banks that operate in Ethiopia from 2003 to 2016. From the group statistics of all the variables, I assume that all the variables follow a normal distribution.

Table 4.1 Descriptive Statistics of Dependent and Independent Variables

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
ROE	0.215924	0.211000	0.357000	0.040000	0.065006	84
NPLR	0.007648	0.003000	0.045000	0.000000	0.009628	84
LTDR	0.685252	0.660000	1.016000	0.488000	0.133464	84
CLAR	0.056764	0.053529	0.117040	0.021000	0.020657	84
CAR	0.128052	0.121500	0.194000	0.064000	0.030654	84
BSLN	22.423180	22.541500	24.111000	19.966000	0.969102	84
IS	0.068286	0.069500	0.076000	0.062000	0.004585	84
INF	0.153571	0.118000	0.364000	0.028000	0.097090	84
GDP	0.099880	0.105000	0.126000	0.021000	0.025284	84

Source: The Researcher computation through Eviews 7

Return on Equity is an indicator of how efficient a company is by using its owners' equity to generate return to shareholders. ROE measured by Net Profit divided by Total Owners Equity ranges from 4% to35.7%. It has a mean value of 21.59% that showing relatively the lowest deviation 6.5 % from its mean value. As shown from the statistical result private Commercial banks that operate in Ethiopia earn 21.59% return on averages from the equity per year. Based on Richard (2015), Return on equity between 15% and 20% are considered desirable, the average industry mean value of 21.59% return on equity tells that the banking industry is the area where it makes good profit. Nevertheless, literature of Nava pan and Tripe (2003) doubts that getting this much return on equity may not always send a good message, but it may also result from having a small, inefficient and less competitive market.

The mean value of NPLR of 0.76 % indicates that the average ratio of NPL over total Loan is less than 1%. The maximum amount of this ratio is 4.5%. As banks only pass 25% in getting into the zone of weak credit risk control system (Agborade 2002), the industry in general not reaching to that stage. The standard deviation of 0.96% is also indicating that there is no that much variation among banks credit risk exposures.

Loan to deposit ratio is measured by total loan divided by total deposit. (LTDR has a minimum and maximum value of 28.8% and 101.6% respectively with the average value of 68.53% has a relatively large deviation from the mean by 13.35% among the bank specific independent variables. In this respect, Willem (2013) mentioned that there is no international limit for the amount of LTDR ratio though some countries required a limit to this ratio.

The ratio more the 100% is abnormal but indicated a maximum 101.6% in Nib International Bank s.c (NIB) in year 2006 may result from liquidity problem that more customers are shifted from the bank to others after loans are disbursed.

An average of Interest Spread was 6.83% with the standard deviation of 0.46% which is much less than 1% deviation from the mean. As shown from the table maximum and minimum interest spread was 7.60% and 6.20% respectively. This could be due to the government set the minimum rate and the majority private banks are similar with this rate. Besides to this, banks have sufficient demand for loan, and do not yet start computing each other by interest rate.

Capital adequacy ratio (CAR) also measured by total equity divided by total assets having a mean value of 12.82% and standard deviation of 3.07% with a minimum and maximum of 6.4% and 19.4% respectively. This indicates that capital adequacy ratio for the sample private commercial banks that operate in Ethiopia during study period were above the minimum requirement, which is 8%.

Bank Size has a mean value 8.12 billion Birr with the standard deviation of 6.77withthe maximum and minimum values of 29.61billion and half a billion respectively. The standard division indicated in Table 4.1 with a value of 6.77 is the maximum from all other variables. This implies that there is a huge difference between the biggest bank and the small bank. Gibson (2001) suggests that the effect of a growing bank's size on profitability may be positive up to a certain limit. This indicates that private commercial banks which have a big size have an advantage of absorbing some credit risks.

The macroeconomic indicators of independent variables were GDP that can affect banks profitability over time. The mean value of real GDP growth rate was 9.99% indicating the average real growth rate of the country's economy over the past 14yearswith maximum growth rate of 12.60% of the economy.

Cost per loan asset measures the cost per loan advanced to customer in monetary term and the function of this is to point out efficiency in distributing loans to customers. The mean percentage for CLA is 5.67% with 2.07% variations which ranges 2.10% to 11.70%.

As shown from the table 4.1 the average inflation rate of the country for the period of this study from 2003 to 2016was 15.36 over the past 14 years and this result was much more than from the average GDPi.e.9.99%. This maximum inflation result was recorded in the year2009 i.e. 36.4% and the minimum was recorded in the year 2010 i.e. 2.8 %.

4.2. CORRELATION ANALYSIS

As known correlation analysis is the type of analysis that measures the relationship between two items. The value of correlation coefficient of the analysis result indicates if changes in one item results in changes in the other item. Correlation is a way to index the degree to which two or more variables are associated with or related to each other.

Table 4.2 Correlation matrix among dependent and independent variables

	ROE	NPLR	LTDR	CLAR	CAR	BSLN	IS	INF	GDP
ROE	1	-0.67809	-0.172254	-0.095367	-0.463561	0.282195	0.047765	0.113024	0.504597
NPLR	-0.67809	1	0.248367	-0.099385	0.161223	-0.320842	-0.05042	-0.314381	-0.489708
LTDR	-0.17225	0.24837	1	-0.563528	0.036822	-0.710713	0.331319	-0.20045	-0.036047
CLAR	-0.09537	-0.09939	-0.563528	1	0.412215	0.608731	-0.38992	0.098961	0.080626
CAR	-0.46356	0.16122	0.036822	0.412215	1	0.101394	-0.25261	0.101908	-0.055271
BSLN	0.282195	-0.32084	-0.710713	0.608731	0.101394	1	-0.58989	0.195067	0.098974
IS	0.047765	-0.05042	0.331319	-0.389921	-0.252609	-0.589891	1	-0.024565	0.092214
INF	0.113024	-0.31438	-0.20045	0.098961	0.101908	0.195067	-0.02457	1	-0.047567
GDP	0.504597	-0.48971	-0.036047	0.080626	-0.055271	0.098974	0.092214	-0.047567	1

Source: The Researcher computation through Eviews 7

Confirming to Brooks (2008), if it is stated that y and x are correlated, it means that y and x are being treated in a completely symmetrical way. Thus, it is not implied that changes in x cause changes in y, or indeed that changes in y cause changes 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.

As shown from above table 4.2 shows that NPLR, LTDR, CLAR Rand CAR is negatively correlated with ROE while interest spread, inflation, GDP and bank size are positively correlated. In addition NPLR, and GDP have a value between 50-75%, therefore they are a medium correlated to the dependent variable. The other variables have a value of less than 50% value and this indicates that they are weekly correlated to the dependent variable.

4.3. TESTING CLASSICAL LINEAR REGRESSION MODEL (CLRM) ASSUMPTIONS

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

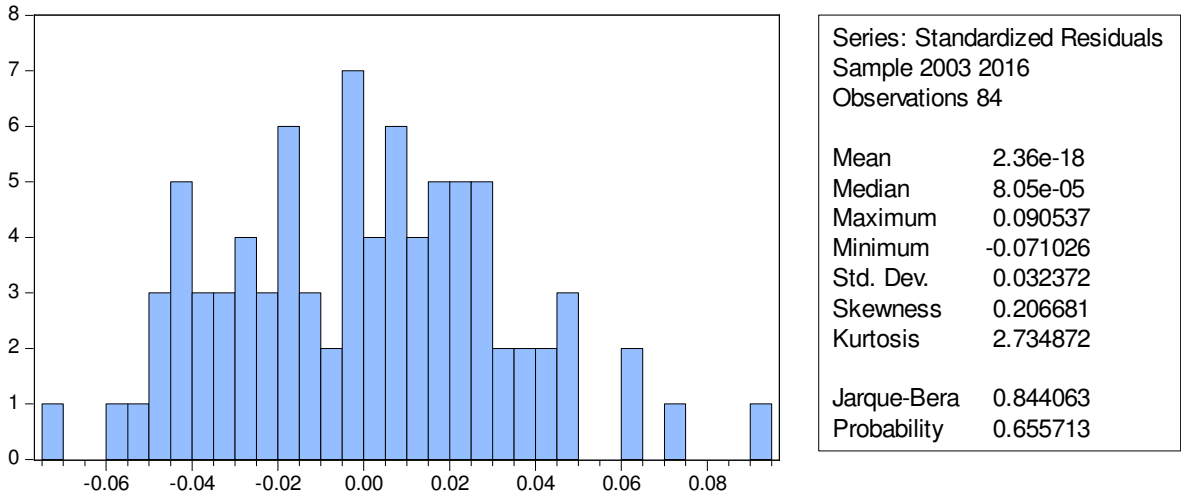
When these assumptions are satisfied, all available information are used in the model. One the contrary, if these assumptions are violated, there will be data that left out of the model (Brooks, 2008). Therefore, before using the model for testing the significance of the slopes and analyzing the regressed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

4.3.1. TEST FOR AVERAGE VALUE OF THE ERROR TERM IS ZERO (E (UT) = 0) ASSUMPTION

The first assumption required is that the average value of the errors is zero. In fact, if a constant term is included in the regression equation, this assumption will never be violated. Therefore, the constant term (i.e. α) was included in the regression equation, the average value of the error term in this study is expected to be zero.

4.3.2. NORMALITY TEST

The next important diagnostic test conducted in this research is the normality assumption (i.e. the normally distributed errors). Brooks (2008) stated that the normality assumption '(ut~ N (0, σ2))' is required in order to conduct single or joint hypothesis tests about the model parameters. To check this normality assumption, the most commonly applied tests is the Jarque-Bera (JB) test. This test uses the property of a normally distributed random variable that the entire distribution is characterized by the first two moments - the mean and the variance (Brooks, 2008, p.161). In case of this study, the researcher used JB normality test to test the null hypothesis of normally distributed errors assumptions.



Source: The Researcher computation through Eviews 7

As shown in the histogram in the appendix here above, kurtosis is around 3 (i.e. 2.734872), the Histogram statistics was not significant at 5% (i.e. 0.655713). Hence, the null hypothesis that is the error term is normally distributed should not be rejected and the error term in all of the cases follows the normal distribution and skewed to the right.

4.3.3. HETEROSCEDASTICITY TEST

Heteroscedasticity test is one of the diagnostic tests of OLS conducted for this study. This theoretically expressed as by Brooks (2008, p.133) ‘’var (ut) = $\sigma 2 < \infty$; it has been assumed that the variance of the errors is constant, $\sigma 2$. One of the basic assumptions for the classical linear regression model is Homoscedasticity assumption that states as the probability distribution of the disturbance term remains same for all observations. That is the variance of each ui is the same for all values of the explanatory variable. If the disturbance terms do not have the same variance or non-homogeneity of variance it is called heteroscedasticity (Bedru and Seid, 2005).

Therefore, to detect the heteroscedasticity problems, Breusch-Pagan test was applied in this study. If the p-value is significant at 95 confidence interval, the data has heteroscedasticity problem, while if the value is insignificant (greater than 0.05), the data has no heteroscedasticity problem.

APPENDIX 2: HETRSKEDASTICITY TEST

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.226442	Prob. F(8,75)	0.2956
Obs*R-squared	9.717655	Prob. Chi-Square(8)	0.2854
Scaled explained SS	5.631260	Prob. Chi-Square(8)	0.6885

Source: The Researcher computation through Eviews 7

As shown in the above Breusch-Pagan-Godfrey, there is no heteroscedasticity problem for this study hence the p- value is 29.56% indicates insignificant value assumption of homoscedasticity.

4.3.4. AUTOCORRELATION TEST

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

Durbin Watson (DW) is a test for first order autocorrelation, i.e. it tests only for a relationship between an error and its immediately previous value. DW is approximately equals to $2(1 - \hat{\rho})$, where $\hat{\rho}$ is the estimated correlation coefficient between the error term and its first order lag (Brooks 2008). The null hypothesis for the DW test is no autocorrelation between the error term and its lag according to Brooks (2008).

The Durbin-Watson test statistic value in appendix 3 was2.038731 where the value of ROE lies in the non-rejection region, there is no autocorrelation problem.

APPENDIX 3: AUTOCORRELATION TEST: DURBIN WATSON

Variables	DWtest static result
All bank specific, industry specific and macro-economic	2.039

4.3.5. MULTICOLINEARITY TEST

Multicolinearity test is conducted to identify the correlation between explanatory variables and to avoid double effect of independent variable from the model. Table 4.3 described correlation among explanatory variables.

Correlation is a single number that describes the degree of relationship between two variables. According to Gujarati (2004), the standard statistical method for testing data for multicollinearity is analyzing the explanatory variables correlation coefficients (CC); condition index (CI) and variance inflation factor (VIF). Therefore, in this research correlation matrix for eight of the independent variables shown below in the table had been estimated.

Table 4.3 Correlation Matrix of Explanatory Variables

	NPLR	LTDR	CLAR	CAR	BSLN	IS	INF	GDP
NPLR	1	0.248367	-0.099385	0.161223	-0.320842	-0.050418	-0.314381	-0.489708
LTDR	0.24837	1	-0.563528	0.036822	-0.710713	0.331319	-0.20045	-0.036047
CLAR	-0.0994	-0.56353	1	0.412215	0.608731	-0.389921	0.098961	0.080626
CAR	0.16122	0.036822	0.412215	1	0.101394	-0.252609	0.101908	-0.055271
BSLN	-0.3208	-0.71071	0.608731	0.101394	1	-0.589891	0.195067	0.098974
IS	-0.0504	0.331319	-0.389921	-0.252609	-0.589891	1	-0.024565	0.092214
INF	-0.3144	-0.20045	0.098961	0.101908	0.195067	-0.024565	1	-0.047567
GDP	-0.4897	-0.03605	0.080626	-0.055271	0.098974	0.092214	-0.047567	1

Source: The Researcher computation through Eviews 7

The results in the above correlation matrix show that the highest correlation of 0.71071 exist between bank size and loan to deposit ratio. Based on the result indicated in the above table, the researcher proves there is no multicolinearity problem in this study as there is no any correlation among the explanatory variables which is more than 80%.

4.4. RANDOM EFFECT (RE) VERSUS FIXED EFFECT (FE) MODELS

To test the relationship between these private commercial banks profitability (ROE) and identified profitability determinants, the theoretical model is developed based on the finance theory from the methodological part of this study. The important issue from the equation panel model is, it is not specified whether it is fixed effects or random effects model. So the focal point the researcher concern here is, to examine whether individual effects are fixed or random. Because, there are broadly two classes of panel data estimator approaches that can be employed in empirical research: fixed effects models and random effects models. This also requires the high concern when the researcher employed the panel data approaches.

According to Gujarati (2004), if T (the number of time series data) is large and N (the number of cross-sectional units) is small, there is likely to be little difference in the values of the parameters estimated by fixed effect model (FEM) and random effect model (REM). Hence the choice here is based on computational convenience. On this score, FEM may be preferable. Since the number of time series (i.e. 14 year) is greater than the number of cross-sectional units (i.e. 6 commercial banks), FEM is preferable in this case.

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

APPENDIX 4: HAUSMAN TEST

Correlated Random Effects - Hausman Test

Equation: Untitled

Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	11.605715	5	0.0406

Source: The Researcher computation through Eviews 7

As shown from the Hausman specification test for this study has a p-value of 0.0406 for the regression model. This indicates that p-value is significant at 5% and then the null hypothesis is

rejected and the alternate hypothesis i.e. fixed effect model is appropriate for the given data set in this study.

4.5. MULTIPLE REGRESSION ANALYSIS

This analysis presents over all the empirical results of the regressions. The entire regression result was made and coefficients of the variables were estimated by EView software version 7. As stated earlier in this study fixed Effect regression model is used and it is an appropriate based on Hausman test. Thus, the fixed effect model used to examine the impact of credit risk on profitability of private commercial banks in Ethiopia:

APPENDIX 3: MULTIPLE VARIABLES REGRESSION MODEL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.039258	0.253381	-0.154938	0.8773
NPLR	-2.528950	0.556870	-4.541366	0.0000***
LTDR	0.016496	0.048336	0.341271	0.0339**
CLAR	-0.524061	0.325857	-1.608257	0.0123**
CAR	-0.670435	0.209278	-3.203560	0.0020***
BSLN	0.014506	0.008807	1.647025	0.1040
IS	-0.379061	1.151438	-0.329207	0.7430
INF	0.014871	0.044803	0.331921	0.7409
GDP	0.772514	0.187127	4.128279	0.0001***
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.752004	Mean dependent var		0.215924
Adjusted R-squared	0.705948	S.D. dependent var		0.065006
S.E. of regression	0.035251	Akaike info criterion		-3.701659
Sum squared resid	0.086982	Schwarz criterion		-3.296523
Log likelihood	169.4697	Hannan-Quinn criter.		-3.538798
F-statistic	16.32790	Durbin-Watson stat		2.038731
Prob(F-statistic)	0.000000			

***, and **, denote significance at 1% and 5%, levels respectively.

Source: The Researcher computation through Eviews 7

The above regression result shows the bank's profitability which is measured by ROE as explained variable and the explanatory variables of bank specific, industry specific and macro-economic factors of determinants. As known R-squared statistics and the adjusted-R squared statistics of model was 75.20% and 70.59% is the power of the explanatory variables that represent the explained variable i.e. (ROE) respectively. The result indicates that the changes in

the explanatory variables explain 70.59% of the changes in the explained variable which is a good result to represent the model.

The F-statistics tests of this regression model is 16.32790 which indicates that the null hypothesis that all of the slope parameters (βs‟) are jointly zero. In the above case p-value of zero attached to the F- statistic shows that this null hypothesis should be rejected even at 1% level of significance.

From table 4.4 it can be seen that nonperforming loan, capital adequacy, loan to deposit, cost per loan ratio and GDP are statistically significant factors that affecting the bank profitability.

The coefficient of explanatory variables affect profitability negatively, which means the one unit of NPLR, CLAR, CAR and IS variables increased in the bank have a -2.53, -0.52, -0.67, and -0.38unit change on banks profitability to the opposite direction respectively. However, LTDR, Bank size, INF and GDP had a positive impact on ROE which implies that one birr change in LTDR, Bank size, INF and GDP will have 0.02, 0.01, 0.01 and 0.77 change on profitability with the same direction respectively.

From the above regression table 4.4 terms of significance level (corresponding p-value) the bank specific factor bank size, the industry specific Interest Spread and Macroeconomic factor of Inflation have more than the selected significance levels (5%) 0.1040, 0.7430 and 0.7309respectively. Opposing to the researcher`s expectation, bank size, Interest Spread and Inflation did not show any significant impact on the level of ROE of private commercial banks in Ethiopia from year 2003-2016.

4.6. DISCUSSION OF THE REGRESSION RESULTS

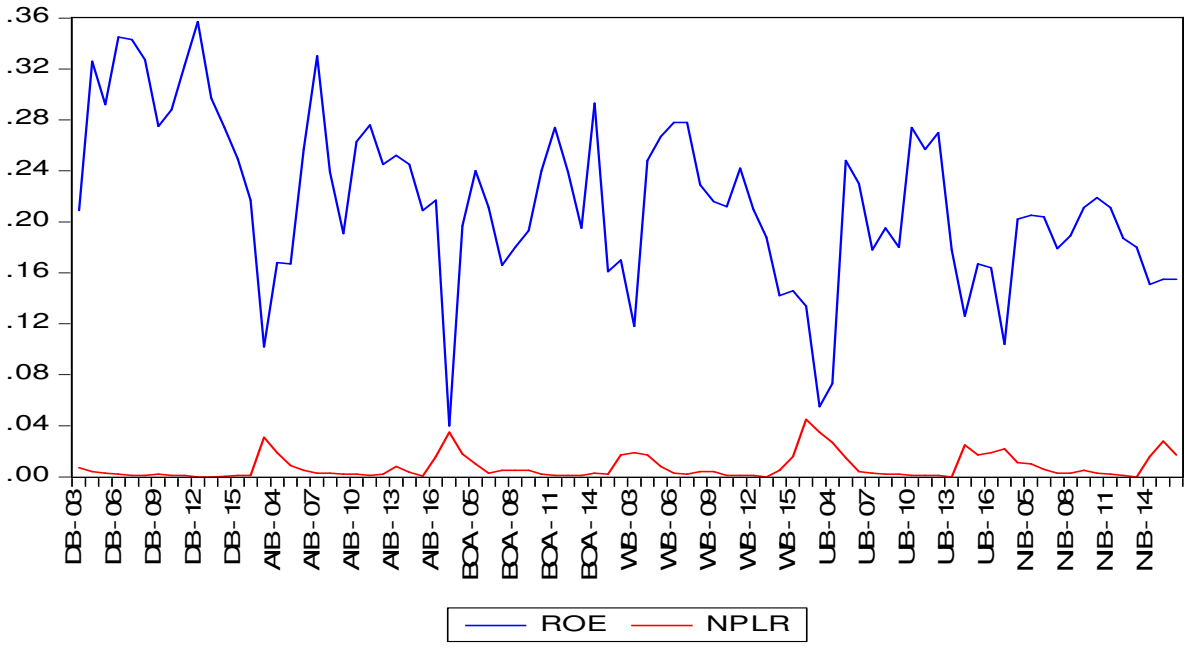
The aim of this study was to examine the impact of credit risk management on profitability of private commercial banks in Ethiopia. Based on studies made previously and the finding of this research, this section discussed the general result obtained via fixed Effect Regression Model as shown in the above table 4.4.Based on the literature made above, the result of each explanatory variable including their impact on the level of ROE of private commercial banks in Ethiopia was discussed. The detailed estimation results that show the impact of explanatory variables on ROE were discussed as follows:

NONPERFORMING LOAN RATIO (NPLR)

Based on the result obtained in the regression table 4.4 one of the bank specific factor which is affect the credit risk is NPLR that has a significant impact on the performance of the bank (ROE). The probability of 0.0000 enables the researcher to reject the null hypothesis of no significant impact on profitability and accept the alternate hypothesis. Non-performing loan Ratio indicates the level of banks' exposure to credit risk.

This finding goes in line with the literatures Misker (2014) Tefera (2011) and Mekasha (2011) concluded that there is a negative relationship between credit risk and performance of commercial banks in Ethiopia. The coefficient -2.52895 implies that the one birr increased on NPLR has a 2.53 unit change on profitability but opposite direction. This finding matches with the researcher expectation.

FIG 4.1 TREND ANALYSIS OF NONPERFORMING LOANS WITH ROE



Source: The researcher computation through View 7 regression result

Based on the above regression result, trained analysis clearly shows that when ROE growth to upside the NPLR will go to downward and then vice versa. This shows that whenever there is small credit risk, the bank performance is good and at the same time whenever there is high credit risk, the bank performance becomes decrease.

Ethiopia banks request a sufficient guarantee or collateral to give a loan. Therefore, the probability of the borrowers failed to fulfill the pre-agreed condition or default is much less. But the attitude of the borrowers to wards to government bank and private banks is different. They are more conscious to government banks than to private banks. As a result, default rate in private banks is high. To minimize this default risk, Ethiopian law of proclamation no. 97/1998 provides to banks for property mortgaged or pledged the right to sell properties which they hold as collateral if the borrowers fails to pay the loan without court order. This is one tool which minimizes default risk in order to maximize their profit accordingly.

LOAN TO DEPOSIT RATIO (LTDR)

The regression table 4.4 shows that the result of LTDR has a probability of 0.0339 with the coefficient of 0.016496. It indicates that the variable has a positive impact on profitability. One Birr given as a loan from a mobilized deposit has an effect of Birr 0.02 on the profitability of Ethiopia private banks. This result is in line with the researcher's expectation

Loan to deposit ratio is the result of the interest rate difference between what the banks charging on loan and what they actually paying on the deposits. If this ratio increases more and more, the bank becomes more and more risky as the loan amount would be equal or sometimes greater than the deposit amount. As a result banks suffer with a liquidity problem and that may also makes the bank risky.

COST PER LOAN ASSET RATIO (CLAR)

Cost per loan asset ratio result in the above regression table 4.4 shows that there is a negative and statistically significant impact on banks profitability. It has a coefficient result of -0.524061 and a p-value of 0.0020. That means cost per loan asset is significant factor for bank performance at 5% significance level. It shows that for one birr change in CLAR, keeping the other things constant has resulted 0.52 unit changes in the banks efficiency to distributing loans to customers in the opposite direction.

CAPITAL ADEQUACY RATIO (CAR)

Based on the findings in the regression table 4.4, capital adequacy has the negative and statistically significant impact on ROE that determines the risk taking behavior of banks. This study identifies statistically significant and negative impact of capital adequacy ratio on ROE. As

a result, the output is consistent with the hypothesis developed in this study. The study hypothesized that there isa positive or negative association between CAR and ROE of banks.

This negative sign shows there is an inverse relationship between capital adequacy ratio and ROE. It implies that for one unit change in the banks' capital adequacy ratio, keeping other thing constant has resulted 0.67 unit changes on the levels of ROE in opposite direction. This means that when banks keep Birr 1 as a CAR, they will loss 0.67 Birr as a profit.

This result also reveals what Berger(1995, Bourke (1989) Hassan and Bashir (2003) had found as they have agreed on equity to total assets ratio is expected to have positive relation with performance that well-capitalized banks face lower costs of going bankrupt which reduces their costs of funding and risks.

BANK SIZE (BS)

Bank size(BS) result in the above regression table 4.4 shows that there is a positive and statistically insignificant impact of Bank Size on bank profitability. It has a coefficient result of 0.014506 and a p-value of 0.1040. Based on this finding, bank size is not affect bank performance. It shows that for one unit change in BS, keeping the other things constant has resulted 0.015 unit change on the level of ROE in the same direction but insignificant.

INTEREST RATE SPREAD (IS)

The regression table 4.4 also shows the result of probability 0.7430 which is higher than the significant value of 5%. Based on this result, the null hypothesis did not be rejected. It implies that Interest spread has no significant impact on ROE. Because there is no stiff completion between banks and the minimum saving interest is set by National Bank of Ethiopia. But, the coefficient -0.379061 indicates that the one unit change in IS will have the effect of 0.38 unit change on the ROE to the opposite direction but insignificantly. Do to this, both the result as well as the coefficient is in contrast with what the researcher has expected. The possible reason for this may be the government close control on the minimum deposit rate and reserve requirement for deposits or banks income made from non-interest income like commissions on money transfer, foreign exchange rate, Letter of guarantee, and various service charges.

INFLATION (INF)

Inflation is one of the macroeconomic factor which has statistically insignificant impact on financial performance. The coefficient 0.014871 shows that inflation affect the bank performance positively like the researcher expectation but not significantly. Since the probability of the regression result for this variable is 0.7409, the researcher is not on the position to reject the null hypothesis

GROSS DOMESTIC PRODUCT (GDP)

A multiple regression result shows that GDP growth rate had statistically significant impact on ROE, the probability 0.0001 help the researcher to accept the null hypothesis. The coefficient sign for real GDP growth rate was also positive which is similar to the researcher expectation. This indicates that the change in GDP to the bank profitability is positive and has significantly impact.

This finding supports the reports of Carling, Jacobson, Linde and Roszbach (2007), Bonfim (2009), IMF (2000), Jimenez and Saurina (2006) as they report that, macroeconomic variables should be included into credit risk analysis since they have considerable influence on the changes of credit risk at the aggregated level.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATION

The paper investigated the impact of credit risk on the profitability of Ethiopian private commercial banks by considering mainly variables related to lending activities. So the previous chapter presented descriptive analysis and examined the results of the regression for all explanatory variables against the theories and the researcher expectations. In addition, the results of findings were also made with the trained analysis of ROE with non-performing loan ratio (NPLR) variable in the regression model which is an indicator of the level of credit risk that affect profitability of the bank negatively.

5.1. CONCLUSION

The central objective of this study was to examine the impact of credit risk on private commercial bank's profitability in Ethiopia based on panel data analysis for the period 2003 to 2016. The data was analyzed by using fixed effect model and used for the purpose of analysis, EView software.

Based on the analysis non-performing loan ratio, loan to deposit ratio, cost per loan asset ratio, Capital Adequacy, bank size and real gross domestic product had a statistically significant effect on the level of return on equity. On the contrary, the results of this fixed effect regression model revealed the insignificant effect of Interest spread rate and inflation rate on the level of return on equity of private commercial banks in Ethiopia for the period under consideration. The findings of regression result indicated that bank credit risk management measured in terms of non-performing loan ratio has negative and statistically significant impact on return on equity. The result shows that the higher the risk one would expect high return since riskier business will have the bigger return. This implies that banks can make a profit as far as they can minimize the credit risk.

Loan to deposit ratio has a positive sign and statistically significant impact on return on equity indicates that the bank charge more than what the bank incurring as interest expense for the depositors and the more loan the bank give will have a significant effect on banks profitability.

The credit administration cost (cost to loan ratio), which reveals the intermediation efficiency in terms of cost, appears most important determinant variable on the profit of Ethiopian private commercial banks. The variable is incorporated in the model to compare the

impact of provisions vs. non-provision costs on the profitability of banks. The surprising result is that this variable appears significant to affect bank's performance.

On the other side, the result of capital adequacy ratio has negative and statistically significant impact on return on equity of private commercial banks that operate in Ethiopia. This result indicates that banks with strong capital adequacy or keep the fund in the bank will have a cost and the bank will loss the profit which should be earns if the money was borrowed.

The other variable, the natural logarithm of total asset (economies of scale) which is usually used to measure for bank's size appears to have a positive relationship with performance. The addition of the variable in the model is explained by in the Ethiopian context bank size usually has association with the age of banks. It's assumed that as banks' stay in the industry increases their exposure to credit risk management will increase due to the learning curve effect. The result is statistically significant which indicates that bank which has big size will have the ability to absorb potential risks and to avoid some expenses. As a result the bank can increase profitability if its size gets big.

The study therefore finds that bank specific factors have an impact on banks profitability and all variables of bank specific factor have a significant impact on profitability, while other external factor of macroeconomic (inflation) and industry specific factors (Interest Spread) have no significant impact in Ethiopia private bank's profitability. But the other macroeconomic factor of real gross domestic product has positive and statistically significant impact on profitability of private banks of Ethiopia. Therefore, it can be concluded that profitability in the Ethiopia banking sector is largely driven by managerial decision as well as macroeconomic external factors.

5.2. RECOMMENDATIONS

Ethiopian banks mostly private banks need to develop their credit risk management capacity by considering the practice of other developing countries which have better experience in the industry-the high level of provision held for poorly performing assets mainly loans and advances is affecting the profitability of Banks. Therefore, improving performance requires instituting a strong credit risk management system that can efficiently identify bankable borrowers and there must be a system that can monitor their performance after the loan is granted. Besides to this, the regulatory framework of Ethiopia should support and make sure banks to have strong policy and credit risk management practice. This can be done through strengthening the internal risk management system to assist the

identification, measurement and monitoring of credit risk as well as directing of the supervision focus towards credit risk. Therefore, based on the findings and the above conclusions of the study, the following recommendations are given.

- The bank should give more attention like managing loan portfolio, analyzing credit risk and utilization on the bank specific factors than the industry factors since industry factor based on this study on banks performance is not significant. The finding also shows that macroeconomic factor GDP has significant on the performance of the bank so as to give attention for this factor
- Ethiopian banks especially private banks should adopt a sound corporate governance practice to manage their risk in an integrated approach by focusing on core banking activities and adhere to wise banking practice
- The private banks management need to be cautious in setting up a credit policy that will not adversely affects profitability and also they need to know how credit policy affects the operation of their banks to ensure sensible utilization of deposits and maximization of profit.
- To maximize profit, banks should improving loan to deposit ratio but up to some stage to maintain liquidity problem.
- The study recommends that a further study should be done on the impact of credit risk on profitability of Ethiopian private banks by including additional variables as credit risk management which decides how banks can be profitable by minimizing the risk amount they took to do the business.

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APPENDIXES

APPENDEX 1: ESTABILISHMENT DATE OF PRIVATE BANKS

No	Name of the bank	Year of establishment	Number of Years since establishment till 2016
1	Awash Bank	1994 GC	22
2	Dashen Bank	1995 GC	21
3	Wegagen Bank	1997 GC	19
4	Bank of Abyissinia	1996 GC	20
5	United Bank	1998 GC	18
6	Nib International Bank	1999 GC	17
7	Cooperative Bank of Oromia GC	2004 GC	12
8	Lion International Bank	2006 GC	10
9	Zemen Bank	2008 GC	8
10	Oromia International Bank	2008 GC	8
11	Buna International Bank	2009 GC	7
12	Brehan International Bank	2009 GC	7
13	Abay Bank	2010 GC	6
14	Addis International Bank	2011 GC	5
15	Debub Global Bank	2012 GC	4
16	Enat Bank	2012 GC	4

APPENDIX 2: HETRSKEDASTICITY TEST

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.226442	Prob. F(8,75)	0.2956
Obs*R-squared	9.717655	Prob. Chi-Square(8)	0.2854
Scaled explained SS	5.631260	Prob. Chi-Square(8)	0.6885

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 12/14/17 Time: 14:54
Sample: 1 84
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.011771	0.010899	1.080053	0.2836
NPLR	0.032008	0.025267	1.266786	0.2092
LTDR	0.000894	0.002098	0.425981	0.6713
CLAR	0.014873	0.013180	1.128429	0.2627
CAR	-0.015688	0.007217	-2.173837	0.0329
BSLN	-0.000306	0.000348	-0.880339	0.3815
IS	-0.077755	0.052671	-1.476231	0.1441
INF	0.003573	0.002064	1.730567	0.0876
GDP	0.015314	0.008504	1.800775	0.0758

R-squared	0.115686	Mean dependent var	0.001363
Adjusted R-squared	0.021360	S.D. dependent var	0.001653
S.E. of regression	0.001636	Akaike info criterion	-9.892742
Sum squared resid	0.000201	Schwarz criterion	-9.632297
Log likelihood	424.4952	Hannan-Quinn criter.	-9.788046
F-statistic	1.226442	Durbin-Watson stat	1.931459
Prob(F-statistic)	0.295607		

APPENDIX 3: *MULTIPLE VARIABLES REGRESSION MODEL*

Dependent Variable: ROE
Method: Panel Least Squares
Date: 12/17/17 Time: 10:31
Sample: 2003 2016
Periods included: 14
Cross-sections included: 6
Total panel (balanced) observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.039258	0.253381	-0.154938	0.8773
NPLR	-2.528950	0.556870	-4.541366	0.0000***
LTDR	0.016496	0.048336	0.341271	0.0339***
CLAR	-0.524061	0.325857	-1.608257	0.0123***
CAR	-0.670435	0.209278	-3.203560	0.0020**
BSLN	0.014506	0.008807	1.647025	0.1040
IS	-0.379061	1.151438	-0.329207	0.7430
INF	0.014871	0.044803	0.331921	0.7409
GDP	0.772514	0.187127	4.128279	0.0001**

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.752004	Mean dependent var	0.215924
Adjusted R-squared	0.705948	S.D. dependent var	0.065006
S.E. of regression	0.035251	Akaike info criterion	-3.701659
Sum squared resid	0.086982	Schwarz criterion	-3.296523
Log likelihood	169.4697	Hannan-Quinn criter.	-3.538798
F-statistic	16.32790	Durbin-Watson stat	2.038731
Prob(F-statistic)	0.000000		

APPENDIX 4: HAUSMAN TEST

Correlated Random Effects - Hausman Test
Equation: Untitled
Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	11.605715	5	0.0406

Period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
NPLR	-1.847735	-2.624293	0.131901	0.0325
LTDR	0.094952	0.072503	0.002301	0.6398
CLAR	-0.195215	-0.463495	0.014351	0.0251
CAR	-0.527942	-0.741222	0.016355	0.0954
BSLN	0.071241	0.028456	0.000228	0.0046

Period random effects test equation:
Dependent Variable: ROE
Method: Panel Least Squares
Date: 12/14/17 Time: 15:12
Sample: 2003 2016
Periods included: 14
Cross-sections included: 6
Total panel (balanced) observations: 84
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.353783	0.418665	-3.233570	0.0019
NPLR	-1.847735	0.708385	-2.608379	0.0113
LTDR	0.094952	0.071775	1.322909	0.1905
CLAR	-0.195215	0.317400	-0.615044	0.5407
CAR	-0.527942	0.208228	-2.535402	0.0136
BSLN	0.071241	0.017592	4.049564	0.0001
IS	NA	NA	NA	NA
INF	NA	NA	NA	NA
GDP	NA	NA	NA	NA

Effects Specification

Period fixed (dummy variables)

R-squared	0.765969	Mean dependent var	0.215924
Adjusted R-squared	0.701160	S.D. dependent var	0.065006
S.E. of regression	0.035536	Akaike info criterion	-3.640570
Sum squared resid	0.082084	Schwarz criterion	-3.090742
Log likelihood	171.9039	Hannan-Quinn criter.	-3.419544
F-statistic	11.81893	Durbin-Watson stat	1.534806
Prob(F-statistic)	0.000000		