

**IMPACT OF CREDIT RISK MANAGEMENT ON BANKS PROFITABILITY
(A CASE STUDY OF SELECTED PRIVATE COMMERCIAL BANKS
IN ETHIOPIA)**

**A Thesis submitted to Partial fulfillment of the Requirement for the Award of Master Science in
Accounting and Finance**

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Declaration

I, the undersigned, declare that this thesis is my original work, has not been presented for a degree in any other university and that all sources of materials used for the thesis have been dully acknowledged.

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Certification

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Abstract

Credit risk is one of the most significant risks that banks face, considering that granting credit is one of the main sources of income in commercial banks. Therefore, the management of the risk related to that credit affects the profitability of the banks. The aims of the research were to investigate the impact of credit risk management on banks profitability in selected private commercial banks in Ethiopia. Explanatory research design was used in this research and Quantitative data type used through secondary source. This data obtained from selected private commercial banks and from National Bank of Ethiopia for 10 years. In order select sample under the study the researcher used purposive sampling method. The descriptive statistics were used to analyze the data. To test the relationships between the credit risk management variable of selected private commercial banks in Ethiopia and banks profitability, multiple linear regressions model was run, and thus Ordinary Least Square (OLS) conducted using econometric software package. The types of the data for this study were panel data including the 10 years of data in the regression analysis. In this research dependent variable is profitability which was measured by ROA where as independent variables are; Loan loss provision, loans and advances, Capital adequacy ,Liquidity ratio, number of branches, GDP ,Inflation, and non performing loan. The study found that LLP, and CAR has significant negative impact on the profitability of private commercial banks in Ethiopia. LR has positive significant impact on profitability of private commercial banks in Ethiopia. LA, NPL, GDP, INFL, and NB have no statically significant impact on the profitability of selected private commercial banks in Ethiopia. The underline results indicate that credit risk management has significant impact on profitability of selected private commercial banks in Ethiopia.

Key words; Credit risk Management, Profitability, Private Commercial Bank

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List of acronyms and abbreviation

AIB	Awash international bank
APT	Arbitrage pricing theory
BOA	Bank of Abisinia
CAPM	Capital asset pricing model
CAR	Capital adequacy ratio
CLRM	Classical linear regression model
DB	Dashen bank
DEA	Data envelopment analysis
DW	Durbin Watson
EBIT	Earnings before interest and tax
GDP	Gross domestic product
IFLN	Inflation
LA	Loan and advance
LLP	Loan loss provision
LR	Liquidity ratio
MPT	Modern portfolio theory
NB	Number of branch
NBE	National bank of Ethiopia
NIB	Nib international bank
NPL	Nonperforming loan
ROA	Return on asset
WB	Wegagen bank

Table of Contents	Page
CHAPTER ONE: INTRODUCTION	1
1.1. Background of the study	1
1.2. Statement of the preoiblem	3
1.3. Objective of the study	6
1.3.2. General objective of the study	6
1.3.2 Specific objectives	6
1.4. Literature driven hypotheses	6
1. 5. Significance of the study	10
1.6. Scope of the Study	10
1.7. Limitation of the study	11
1.8. Conceptual framework	11
1.9. Organization of the Paper	12
CHAPTER TWO: LITERATURE REVIEW	13
2.1. Theoretical Reviews	13
2.1.1. Credit Risk	13
2.1.2. Credit Risk Management of banking	14
2.1.3. Modern Portfolio Theory Model	14
2.1.4. Capital Asset Pricing Model	16
2.1.5. Arbitrage Pricing Theory	17
2.1.6. Source and Determinants of Credit Risk	18
2.1.7. Components of Credit Risk in Bank's Loan Portfolio	19
2.1.8. Credit Risk Assessment and Measurement	19
2.1.9. Credit Risk Management System of Banks	19
2.1.10. Credit Risk Management Strategies	20
2.1.11. Impacts of Credit Risk Management in Banks	21

2.1.12. Principles for the Assessment of Banks' Management of Credit risk	21
2.1. 13. Factors affecting credit risk management	24
2.2. REVIEW OF RELATED EMPIRICAL LITERATURE	27
2.2.1. Empirical literature in global view	27
2.3. Empirical Literature in the Ethiopian Context	32
CHAPTER THREE: RESEARCH METHODOLOGY	34
3.1. Research Design	34
3.2. Data type and sources	34
3.3. Sampling design	34
3.4. Data Analysis Techniques	35
3.5. Variable Measurement	35
3.5.1. Dependent Variables	35
3.6. Model Specification	39
CHAPTER 4: RESULTS AND DISCUSSION	42
4.1. Descriptive statistics Analysis	42
4.2. Correlation Analysis	44
Table 4.2: Correlation Coefficient Matrix	45
Source: Eviews 6 outputs based on sample data	45
4.3 Assumptions of the Classical Linear Regression Model and Diagnostic Tests	47
4.3.Regression Results	52
4.5. Testing of Hypothesis	55
CHAPTER FIVE CONCLUSIONS AND RECOMMENDATIONS:	60
5.1. Conclusions	61
5.2. Recommendations	63

List of Table

Table no.	Page no.
Table 4.1: Descriptive Statics of the Variables-----	43
Table 4.2 Correlation analysis-----	45
Table 4.3 Hetroscedasticity test : white test-----	48
Table 4.4 Multicollinearity test-----	52
Table 4.5 Regression result-----	53
Table 4.6 summary of Hypothesis and Result-----	60

List of Figures

Figure No	page no
Figure 4.1 Rejection and Non- Rejection Regions for DW Test-----	49
Figure 4.2 Normality Test Result-----	50

CHAPTER ONE

INTRODUCTION

This chapter presents the overall introduction to the paper. The first section presents background of the study followed by statement of the problem, objective of the study, literature driven hypothesis, significant of the study, scope of the study, limitation of the study, conceptual frame work and finally the origination of the paper.

1.1. Background of the study

Bank is a commercial or state institution that provides financial services, including issuing money in various forms, receiving deposits of money, lending money and processing transactions and the creating of credit Campel, et al, (1993). Commercial banks as financial intermediaries are very significant in the economy of every nation. The relevance of banks to the economy lies primarily in their ability to mobilize credit and grant credit to various economic actors. Lending operations are core banking activities and the most profitable asset of credit institutions. In many markets, banks have to operate in the economic environment that is characterized by the existence of obstacles to good credit management. Where credit is not properly channeled, controlled and administered, it leads to a devastating effect on the banks, reducing its performance, profitability and further into bank distress and failure Berger and Christa, (2009). The credit function of banks enhances the ability of investors to exploit desired profitable ventures. Credit creation is the main income generating activity of banks Kargi, (2011). The key strategic value a bank adds has always depended upon its ability to manage credit risk. However, this cannot be properly done without an effective risk assessment, control and follow up strategy. It exposes the banks to credit risk.

The Basel Committee on Banking Supervision (2001) defined credit risk as the possibility of losing the outstanding loan partially or totally, due to credit events (default risk). Credit risk is an internal determinant of bank performance. The higher the exposure of a bank to credit risk is the higher the tendency of the banks to experience financial crisis and vice-versa. It is also defined as loss due to debtor's nonpayment of a loan or other line of credit (either the principal or interest (coupon) or both) default rate is the possibility that a borrower will default, by failing to repay principal and interest in a timely manner. If credit risks increase with the growing volume of credit transactions in banks, bad and doubtful debts will claim a bulk of the supposed profit estimated to be earned by banks. As these risks remain unchecked, the profitability of banks reduces with each transaction. This also reduces the operational performance of banks Campel, et al, (1993).

According to Bessis, (2005), credit risk management is important to bank management because banks are 'risk machines' they take risks; they transform them and embed them in banking products and services. Risks are uncertainties resulting in adverse variations of profitability which shows the financial performance or in losses that show the bank's failure.

Profitability is an indicator of banks' capacity to carry risk and/or increase their capital. It indicates banks' competitiveness and measures the quality of management. The determinants of commercial banks' profitability can be concluded into two categories, namely those that are management controllable (internal determinants) and those are beyond the control of management (external determinants). Based on Guru et.al, (1999), the internal determinants reflect upon banks' management policy and decision concerning sources and uses of funds management, capital and liquidity management and expenses management. This kind of profitability factors can be examined by financial statements of commercial banks. The external factors are environment factors and firm-specific ones. The relevant literature may be categorized as: the effects of firm (internal) specific factors on profitability and the effects of (external) macroeconomics variables on profitability.

According to Cai and Anjan, (2008), credit administration is the most important function of the banking industry. It is the most risky and difficult, and at the same time most profitable function performed by banks. Risk increases when credit principles are violated. Sound banking practices require that bank management put in place standards for appraising and approving individual credit application to ensure that loans granted are repaid. Credit risk management is the activity which integrates recognition of risk, risk assessment, developing strategies to manage it, and mitigation of risk using managerial resources. He also add that CRM is very important to banks as it is an integral part of the loan process by minimizing banks risk, adjusted risk rate of return by maintaining credit risk exposure with view to shielding the bank from the adverse effects of credit risk since banks are investing a lot of funds in credit risk management modeling. However, due to poor credit administration caused by loopholes and violation in risk assessment and control techniques, bad and doubted debts still claim a bulk charge on bank performance causing many banks to witness institutionalized distress and some, total unexpected collapse. The poor quality of the banks' loan assets hindered banks to extend more credit to the domestic economy, thereby adversely affecting economic performance. In Ethiopia lending carries a reasonable portion of resource exposure of deposit banks, the ability of a bank to generate much profit is largely a function of effective and efficient management of its lending portfolio Girma mekasha, (2011). Considering the above reasons National bank of Ethiopia modified guidelines for developing CRM framework for banks risk elements in line with its supervisory model to include strengthening the credit appraisal procedures, storage and dissemination of credit data, monitoring of over-exposure to borrowers, facilitating consistent credit classification and affording regulators first hand information on customer's global debt profile (NBE report, 2013).

As of many research studies in developed and developing country like research done by Cai and Anjan (2008), Gestel & Baesems, (2008), Halling& Hayden, (2006), and Tabari, Ahmadi and Emami, (2013) In the area of impact of credit risk management on banks profitability, there are certain researcher studies also on the same title in Ethiopia, among them Girma, (2011), Nuredin (2010), Tibebe, (2011) and Tsehay, (2014). Few existing studies have attempted to investigate the impact of credit risk management on profitability of public owned banks and the remaining the banking sector as a whole. As far as researcher reading is concerned and the importance of the issue, the researcher believes that substantial amount of studies not conducted in this problem area especially in Ethiopian commercial banks. Thus,

this gap initiates the researcher to conduct with impact of credit risk management on bank profitability on private commercial banks in Ethiopia.

1.2. STATEMENT OF THE PROBLEM

Credit risk is one of significant risks of banks by the nature of their activities. Through effective management of credit risk exposure banks not only support the viability and profitability of their own business but also contribute to systemic stability and to an efficient allocation of capital in the economy (Psillaki, Tsolas, and Margaritis, 2010). The default of a small number of customers may result in a very large loss for the bank. Credit risk is a risk of borrower default, which happens when the counterpart fails to pay on time. There can be many reasons for default. One of the most common ones is the obligor is in a financially stressed situation (Gestel & Baesems, 2008).

The strength of the banking industry is an important prerequisite to ensure the stability and growth of economy (Halling & Hayden, 2006). As a consequence, the assessment of banks' financial condition is a fundamental goal for regulators (Halling & Hayden, 2006). Besides, Tabari, Ahmadi and Emami (2013) have mentioned "the safety of banking system is depending on the profitability and capital adequacy of banks. Profitability is a parameter which shows management approach and competitive position of bank in market-based banking. This parameter helps the banks to tolerate some level of risk and support them against short-term problems.

On the global level, there are different studies that have been conducted on the impact of credit risk management on banks profitability. For instance Fan Li and Yijun Zou, (2014), Chen and Pan (2012), Al-Khouri (2011), Flannery and Ragan (2002), Liyuqi, (2007), Flix and Claudine, (2008), Gestel and Baesems, (2008), Haslem, (1968) argued that the internal factor (banks' management policy and decision concerning sources and uses of funds management, capital and liquidity management and expenses management) has significant impact on banks profitability. There are other studies (Ruziqa, (2013), Ogo, (2012), Feng z.et.al, (2004) which conclude that the impact of credit risk management has negative impact on banks profitability.

In Africa there are studies made by different researcher on the impact of credit risk management on banks profitability. For instance Muthee, (2010), Muasya, (2009) ,Wanjira(2010), Kolopo, (2012), Kithingi, (2010), Kargi, (2011), Onaolapo, (2012) have conducted their research and concluded that credit risk management has an impact on profitability of commercial banks.

To the best of the researcher knowledge based on available literature, few studies are conducted in Ethiopia on the impact of credit risk management on banks profitability. Girma, (2011) studied his research on Credit Risk management and its impact on performance of Ethiopian Commercial Banks. The finding conform that loan provision to non- performing loan and loan provision to total asset of financial

institution is significantly positive related to return on asset . Studies made by Tibebe, (2011) shows that both nonperforming loan ratio and capital adequacy ratio has a negative and significant impact on profitability of commercial banks in Ethiopia. Tsehay Bekele, (2014) concluded that, LA and CLA have a significant and negative impact on the profitability of commercial banks and BS and DEP had positive effect on bank profitability of public commercial banks of Ethiopia.

Even though there are studies conducted in Ethiopian content but most them are focused on credit risk management combining of both private and public owned commercial banks and some of them are focused only in public commercial banks and also some of the variable like GDP and inflation are excluded in their studies. But the current study incorporate key macroeconomic variable like GDP and Inflation.

It is a major concern for bank customers to be aware of the safety of their deposits in any given bank. For this reason, it is very essential for banks to critically assess the customers who demand the extension of credit or loan facility before granting such. This is because a weak and poorly administered credit policy would lead to bad debt in the loan portfolio of banks. These will in-turn affect the entire asset strength of the banks which consequently poses a liquidity threat to the bank.

Since Ethiopian economy is developing with double digit growth rate, banking sector also has shown a rapid progress in terms of number of commercial banks, total assets and total deposit, total loan, increasing their outreach to remote areas, shifting of market share from state owned banks to private owned banks, continuously reporting profits of different magnitude and major reform on banking industry on 2010 make the examination of the credit risk management and financial performance this time very necessary (NBE 2010).

Based on the above reason and research gap there is need to conduct study on credit risk management of selected private commercial banks in Ethiopia. Therefore study is attempted to investigate the impact of credit risk management on banks profitability of selected private commercial banks in Ethiopia.

1.3. Objective of the study

1.3.2. General objective of the study

The general objective of the study is to examine the impact of credit risk management on profitability of selected private commercial banks in Ethiopia.

1.3.2 Specific objectives

- To determine the relationship between nonperforming loans and profitability.
- To see the relationship between loan loss provisions and profitability.
- To examine the relationship between loans and advances and profitability.
- To know whether capital adequacy contributes to profitability.
- To establish the nature of relationship between liquidity ratio and profitability.
- To assess the significant relationship between inflation and profitability.
- To investigate the relationship between numbers of branches and profitability.
- To establish the nature of relationship between GDP and profitability.

1.4. Literature driven hypotheses

Based on review of different literature, the determinant of commercial banks' profitability can be categorized into two: Those that are management controllable or internal determinants (nonperforming loan, loans and advances, loan loss provision, capital adequacy ratio, liquidity ratio, loan size and number of branches) and those that are beyond the control of management (external determinants). This research mainly focused on both the analysis of internal and external determinants because the purpose is to test the impact of credit risk management on firm's profitability and to this effect the study used return on asset (ROA) as a measure of private banks profitability.

Dependent variable:

Profitability: Return on asset (ROA) and return on equity (ROE) can be used to view the performance in terms of profitability. In this study profitability was represented by return on asset (ROA). 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: $ROA = \frac{EBIT}{\text{Total Assets}}$. 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 asset (Haslem, 1968).

Independent variable:

Nonperforming loan (NPL): NPL are credits which banks perceive as possible losses of funds due to loan default. NPL is an independent variable and it is chosen because it is an indicator of credit risk management and in particular, indicates how banks manage their credit risk because it defines the proportion of loan losses amount in relation to Total Loan amount (Hosna et al, 2009). Many banks experienced failure and global financial markets faced systemic crisis. The experience of crisis increases further concerns on financial system stability and the need for better control and supervision on lending activities and institutions, the aggregate rate of non-performing loans (NPLs) is commonly measured as a

soundness indicator. The researcher expects that non- performing loans have an adverse effect on bank profitability.

H₀: There is no significant relationship between non- performing loans and bank's

Profitability

H₁: There is significant relationship between non- performing loans and bank's Profitability

Loan loss provisions (LLP): LLP is an amount of money that a bank set aside from its annual earnings as a precaution against possible loss of a non performing loan, or to off-set a lost credit facility.LLP shows the anticipated loss of value in the loan portfolio gradually over the periods in which that asset generate income, instated of waiting until the actual loss of asset is incurred. Provision for loan impairment charged to a period is expensed in the income and expense statement (Kargi, 2011).

H₀: There is no significant relation between loan loss provisioning and profitability.

H₁: There is significant relation between loan loss provisioning and profitability.

Loans and advance (LA): LA is a facility granted to a bank customer that allows the customer makes use of banks funds which must be repaid with interest at an agreed period. The interest raised from the loans is the most important source of the banks income. Loan is the most important indicator of profitability in the bank financial statement because they reflect the bank primary activities. Higher in loans and advance, banks profit declined (Kenneth, 2013). Like the work of Tsehay Bekele (2014),the researcher also describe loan and advance as log of total loan and advance this is because to keep the linearity relation between loan and advance and profitability.

H₀: There is no significant relationship between loans and advances and bank's

Profitability

H₁: There is significant relationship between loans and advances and bank's

Profitability

Capital Adequacy Ratio (CAR): CAR is an index regulatory authorities use to determine the optimum amount of money (i.e. equity, retained earnings, and other reserves) that a bank must have to be able to take certain levels of risk endangering deposits funds, or its existence. This is also an independent variable and is chosen because it is the core measure of a bank's financial strength from a regulator's point of view. It consists of the types of financial capital considered the most reliable and liquid, primarily shareholders' equity. Banks with good Capital Adequacy Ratio have good profitability (Haslem, 1968).

H₀: there is no significant relation between Capital adequacy and bank's profitability

H₁: there is significant relation between Capital adequacy and bank's profitability

Liquidity ratio (LR): LR is the ability of a bank to meet its short term obligation as and when due. Cash is the important current assets for the operation of any business. It is the input needed to keep the business running continuously. A bank as a business concern needs to have cash and liquid assets which it can easily convert into cash at short notice.. Thus, for banks to remain in the business of financial intermediation, they must formulate policies to ensure the availability of cash and liquid assets in the asset portfolio at any point in time. Liquidity risk reduces the ability of the bank to meet its financial obligations as they fall due. When this risk remains unchecked, banks will lose customers thereby reducing the volume of deposits. When deposits reduce, the bank will have insufficient funds for other investments; this significantly reduces the level of profitability. Again, a high liquidity risk causes a run on the bank. This run is evidenced in the panic withdrawal of deposits by customers from the bank. This adversely affects the potentials of the bank by keeping away would be customers and potential investors from the bank. Consequent upon this, the bank's operations reduce drastically and results in a significant reduction in profit (Bourke, 1989).

H₀: there is no significant relation between liquidity ratio and bank's profitability

H₁: there is significant relation between liquidity ratio and bank's profitability

Number of branches (NB): NB is a relationship between credit risk management and commercial bank's branch expansion. Credit risk management influenced by bank branches, but the expansion of bank branches is also influenced by the level of deposits in any area. Due to the expansion of numbers of branch commercial banks collect huge amount of deposit and this deposit lend to the borrowers. Expansion of numbers of branch also helps the commercial banks to manage their credit risk (Campel, 1993).

H₀: There is no significant relation between numbers of branch and bank profitability

H₁: There is significant relation between numbers of branch and bank profitability.

Annual GDP Growth Rate: Annual real GDP growth rate is a measure of the total economic activity and it is adjusted for inflation. It is expected to have an impact on numerous factors related to the demand and supply for banks deposits and loans. According to the literature on the link between economic growth and financial sector profitability, GDP growth is expected to have a positive relation on bank profitability (Demirguc-Kunt and Huizinga, 1999; Bikker and Hu, 2002). A study by Tang and Jiang, (2003) about the profitability of the banking sector, they found that both Bank specific as well as macro- economic factors are important determinants in performance of Banks. From a sample of four Banks in Hong Kong, Tang and Jiang highlights that macro-economic factors, real GDP growth, inflation and interest rate have a positive impact.

H₀: There is no significant relationship between annual GDP growth rate and banks profitability

H₁: There is significant relationship between annual GDP growth rate and banks profitability.

Annual Inflation Rate: Inflation is an important determinant of banking performance. High inflation rates are related with high loan interest rates and incomes. The effect of inflation on banking performance depends on whether inflation is predicted or unexpected. If inflation is fully anticipated and interest rates are adjusted accordingly, a positive impact on profitability will result. On the other hand, unanticipated

raises in inflation cause cash flow difficulties for borrowers which can lead to premature termination of loan planning and loan losses Nayeem et al, (2014). The findings of the relationship between inflation and profitability are varied, most studies observe a positive impact between inflation and profitability, Molyneux and Thorton 1992, Hassan and Bashir 2003, Kosmidou 2006, Kyriaki 2012 and Nayeem et al.,2014) conclude that inflation have a positive and significant impact on performance.

H₀: There is no significant relation between Annual inflation rate and banks profitability.

H₁: There is significant relation between annual inflation rate and banks profitability.

1.5. Significance of the study

The question of credit risk and common exposures are clearly of enormous importance for regulators, industry participants and investors. The results of this research will have implications and importance to various stakeholders as follows:

First, the study will help to private commercial banks through providing an insight in to the credit risk attributes this may need to be incorporated in their investment decision process

Second, this research will help to regulators and policy makers to mitigate the financial system from financial crises and to better appreciate and quantify credit risk exposure.

Third, to investors, this study will help them to understand the factors that influence the return on their investment. Finally, this study will be served as a reference for extended research on impact of credit risk management on banks profitability in Ethiopia

1.6. Scope of the Study

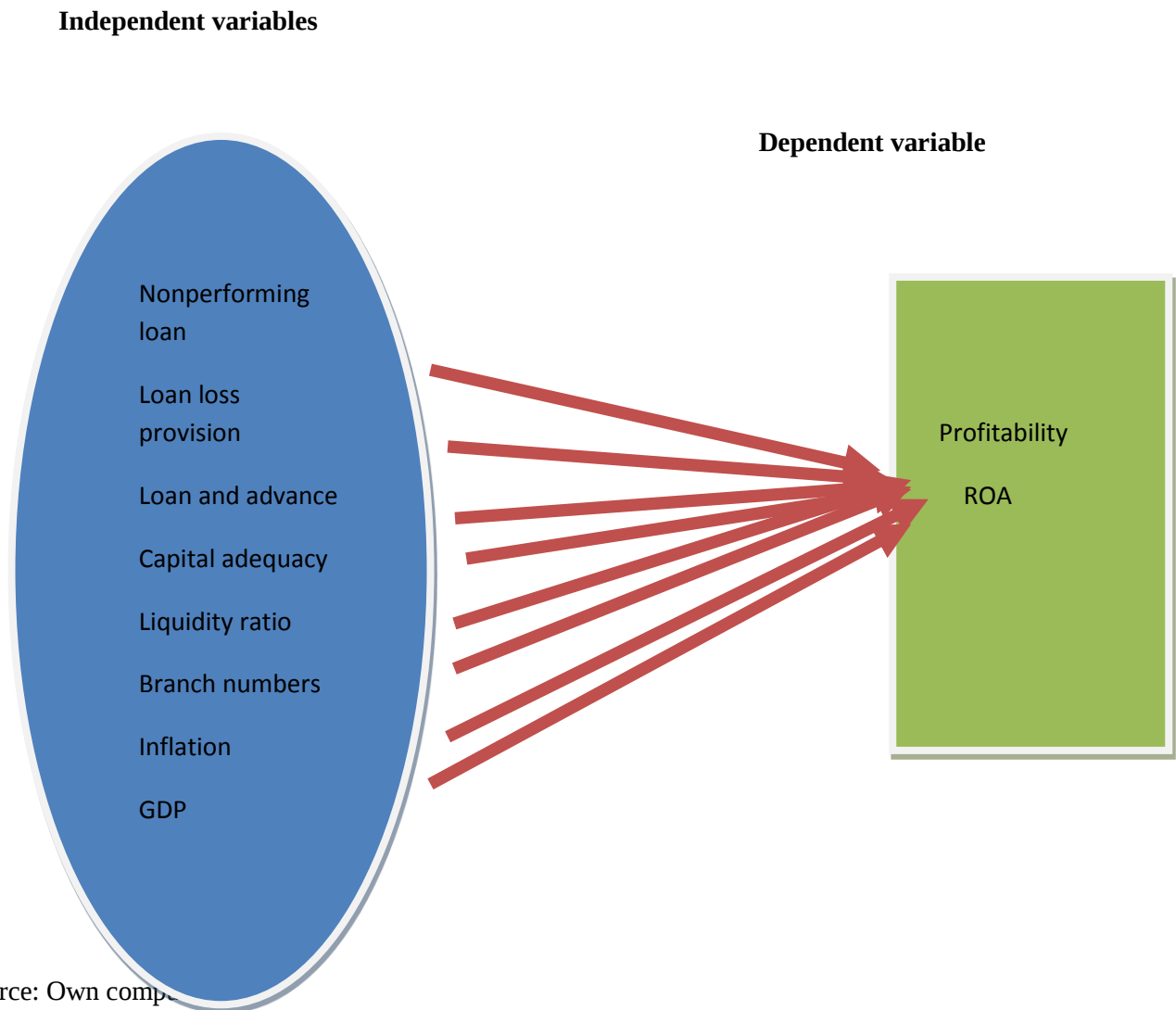
The study assessed the impact of credit risk management on banks profitability of only selected private commercial banks in Ethiopia by analyzing the financial statement started from 2005 to 2014 fiscal year's. The dependent variables are return on asset. The explanatory (independent) variables are delimited to nonperforming loan, loan loss provision, loans and advances, capital adequacy ratio, liquidity ratio, numbers of branches annual inflation rate and annual GDP growth rate . Only six private commercial banks were used while undertaking the study. Namely; Dashen Bank, Awash International Bank, Wegagen Bank, United Bank, NIB International Bank, and Bank of Abyssinia.

1.7. Limitation of the study

The researcher tries to accomplish the objective of the study successfully. But time concern and source of fund was being the main limitation that may hinder the successful accomplishment of the paper. In addition to the above two factors data limitation and sample limitation are the other sides to the limitation part of the study.

1.9. Conceptual Framework

The schematic diagram below describes the relation between dependent variable and independent variables.



1.10. Organization of the Paper

The study is organized into five chapters. The first chapter deals with introduction: background of the study, statement of the problem, objectives, and hypotheses, significance of the study, scope of the study and organization of the papers. The second chapter is all about theoretical as well as of empirical literature pertinent to the study. Chapter three presents methodology of the study. Data analysis and discussion of results is covered in chapter four. Finally chapter concludes the study by forwarding some policy recommendations.

CHAPTER TWO

LITERATURE REVIEW

This chapter presents the review of related literatures. The chapter is divided into two sections. The first section presents the theoretical review of literatures related topic of the study. The

second section discusses the empirical literatures studied by different researchers from globally and Ethiopia point of view that are related to the problem under study.

2.1. Theoretical Reviews

2.1.1. Credit Risk

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

The higher this provision becomes, relative to the size of total loans, the riskier a bank becomes. An increase in the value of the provision for loan losses relative to total loans is an indication that the bank's assets are becoming more difficult to collect (Tshore, Aboagy and Koyerhoah Coleman, 2005). Credit risk is the risk of a loss resulting from the debtor's failure to meet its obligations to the Bank in full when due under the terms agreed (R.S. Raghavan 2003). Credit risk has the highest weight among risks taken by the Bank in the course of its banking activities.

Credit risk limits are determined by the Credit Committee and approved by the Bank's Management Board (in case the Credit Committee does not have the required authority). A part of authorities for putting credit limits in place is delegated to Branch Credit Committees (for standard credit operations within the special limit for independent credit risk-taking by branches), as well as to the Small Credit Committee.

2.1.2. Credit Risk Management of banking

The banking industry has long viewed the problem of risk management as the need to control four of the above risks which make up most, if not all, of their risk exposure, viz., credit, interest rate, foreign exchange and liquidity risk. While they recognize counterparty and legal risks, they view them as less

central to their concerns. Where counterparty risk is significant, it is evaluated using standard credit risk procedures, and often within the credit department itself. Likewise, most bankers would view legal risks as arising from their credit decisions or, more likely, proper process not employed contracting. Accordingly, the study of bank risk management processes is essentially an investigation of how they manage these four risks. In each case, the procedure outlined above is adapted to the risk considered so as to standardize, measure, constrain and manage each of these risks. To illustrate how this is achieved, this review of firm-level risk management begins with a discussion of risk management controls in each area. The

more difficult issue of summing over these risks and adding still other, more amorphous, ones such as legal, regulatory or reputational risk, will be left to the end (Santomero, 1997).

2.1.3. Modern Portfolio Theory Model

Modern portfolio theory was largely defined by the work of Markowitz (born in 1927) in a series of articles published in the late 1950s. The theory was extended and refined by Sharpe (1934), Litner (1916 1983), Tobin (1918), and others in the subsequent decades.

MPT is a theory of finance which attempts to maximize portfolio expected return for a given amount of portfolio risk, or equivalently minimize risk for a given level of expected return, by carefully choosing the proportions of various assets. Modern Portfolio theory was introduced by Harry Markowitz in his paper "Portfolio Selection," which appeared in the 1952 Journal of Finance.

The portfolio theory integrates the process of efficient portfolio formation to the pricing of individual assets. It explains that some sources of risk associated with individual assets can be eliminated or diversified away, by holding a proper combination of assets (Bodie et al, 1999).

The fundamental concept behind MPT is that the assets in an investment portfolio should not be selected individually, each on their own merits. Rather, it is important to consider how each asset changes in price relative to how every other asset in the portfolio changes in price.

Investing is a tradeoff between risk and expected return. In general, assets with higher expected returns are riskier. For a given amount of risk, MPT describes how to select a portfolio with the highest possible expected return. Or, for a given expected return, MPT explains how to select a portfolio with the lowest possible risk (the targeted expected return cannot be more than the highest-returning available security, of course, unless negative holdings of assets are possible.) Therefore, MPT is a form of diversification. Under certain assumptions and for specific quantitative definitions of risk and return, MPT explains how to find the best possible diversification strategy.

The main benefit of forming portfolios is the potential to create combinations with lower risk and possibly higher expected returns that can be obtained from individual securities (Butterworth, 1990). Now consider the risk associated with individual security as the sum of two parts. One part is represented by risk factors that are truly unique (unsystematic risk) to the specific security. The other part is represented by factors that are essentially common with all other securities. For example, the potential for a key employee to leave the firm unexpectedly or the possibility of discovering gold under corporate

headquarters are unique factors that are not shared with other firms (Michaud, 1998). On the other hand, risk factors concerning the potential for unexpected and rapid growth in the National (or International) economy that affect the operating costs for all firms represent example of common risk factors. While portfolio formation reduces the influence of unique risks associated with individual securities, it cannot eliminate exposure to common risk factors. Stated differently, properly constructed portfolios allow for diversification of unique risk, but not for systematic (market) risk (Markowitz, 1991).

In summary, portfolio management theory assesses risk and return relationships for combinations of securities. While the expected return of a portfolio is the simple weighted average of the expected returns of its component securities, portfolio risk must also consider the correlation among the returns of individual securities. Since part of the price fluctuation of a security is unique, it does not relate to price fluctuations of other securities held. This allows the investor to diversify, or eliminate a portion of each security's risk (Michaud, 1998).

In Banking loans constitute the assets in the financials and therefore the theory can be used to expound on the needs of commercial banks forming a portfolio that cuts across different industries and businesses. The portfolio can be formed on the basis of purpose, time period, industry etc. The theory poses a number of gaps; the initial intent by Markowitz was to address the importance of investment portfolio for investors to spread risk when investing and not management of loan portfolio in banks. Some of the issues not addressed by the theory include; how banks can form a portfolio of loans that minimize risk and maximize return. It does not outline ways of determining a risk free portfolio. In addition the theory does not address various risks that are faced by banks when managing a loan portfolio. Therefore, the theory cannot apply holistically when managing credit risk in banks.

2.1.4. Capital Asset Pricing Model

The Capital Asset Pricing Model (CAPM) was first developed by Sharpe (1964) and Lintner (1965). Sharpe and Lintner version of CAPM was based on the one period mean variance portfolio theory of Markowitz. The Markowitz assumes that investors are risk averse and only care about risk (variance) and return (mean) of theory one period investment return. Therefore investors chose mean variance –efficient portfolio, meaning that they either maximize the expected return, giving a certain variance of portfolio return or minimize the variance given a certain expected return. To obtain the CAPM in the basic form some assumptions need be fulfilled and are explained in the following Michaud, (1998):

Firstly, investors are risk adverse as in Markowitz Model and evaluate their investment only in terms of expected return and variance of return measure over the same single holding period.

The second assumptions is that Capital market are perfect meaning that all assets are indefinitely divisible, that no transactions cost, short selling restrictions or taxes occurs, that all investors can lend and borrow at the risk free rate and that all information is costless and available for everyone.

Thirdly, all investors have the same investment opportunities and finally, all investors estimate the same individual asset return, correlation amongst assets and standard deviation of return.

CAPM uses a measure of systematic risk that can be compared with other assets in the market. Using this measure of risk can theoretically allow investors to improve their portfolios and managers to find their required rate of return. The CAPM therefore is a demand-side model. Its results arise from the investors'

utility function maximization problem, and from the resultant market equilibrium. As investors can be considered to be consumers of the asset, the demand approach is reasonable but the model does not really demonstrate how banks can manage its loan risks and for this reason the model cannot apply when managing credit risks in banks.

2.1.5. Arbitrage Pricing Theory

A substitute and concurrent theory to the CAPM is one that incorporates multiple factors in explaining the movement of asset prices. The arbitrage pricing model (APT) on the other hand approaches pricing from a different aspect. It is rarely successful to analyze portfolio risks by assessing the weighted sum of its components. Equity portfolios are far more diverse and enormously large for separate component assessment, and the correlation existing between the elements would make a calculation as such untrue. Rather, the portfolio's risk should be viewed as a single product's innate risk (Laurent Clerc, 2004).

The APT represents portfolio risk by a factor model that is linear, where returns are a sum of risk factor returns. Factors may range from macroeconomic to fundamental market indices weighted by sensitivities to changes in each factor. Factors may be economic factors (such as interest rates, inflation, GDP) financial factors (market indices, yield curves, exchange rates) fundamentals (like price/earnings ratios, dividend yields), or statistical (e.g. principal component analysis, factor analysis).

APT model calculates asset pricing using the different factors and assumes that in the case market pricing deviates from the price suggested by the model, arbitrageurs will make use of the imbalance and veer pricing back to equilibrium levels. At its simplest form, the arbitrage pricing model can have one factor only, the market portfolio factor. This form will give similar results to the CAPM.

According to Defusco et al, (2007) APT model based on following assumptions: relationship between expected returns and risk-factors is linear; a quantity of securities is close to infinite; expectations of investors are identical; Stock markets are perfect (there are no transactions costs and competition is perfect); and finally, there are no arbitrage opportunities in the market among well-diversified portfolios. This theory therefore emphasizes on the portfolio investments but does not give a clear approach for banks to manage loan risks.

2.1.6. Source and Determinants of Credit Risk

Credit risk management which refers to identification, analysis and assessment, monitoring and control of credit has direct implications on the amount of loans extended to customers. Credit risk is most simply defined as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms. The goal of credit risk management is to maximize a bank's risk-adjusted rate of return by maintaining credit risk exposure within acceptable parameters. Banks need to manage the credit risk inherent in the entire portfolio as well as the risk in individual credits or transactions. Banks should also consider the relationships between credit risk and other risks. The effective management of credit risk is a critical component of a comprehensive approach to risk management and essential to the long-term success of any banking organization (Saunders & Marcia, 2011).

According to Hosna et al. (2009), the main source of credit risk in commercial banks are include limited capacity, inappropriate credit policies, unstable interest rates, poor management, lack of information, low capital and liquidity levels, direct lending, poor loan assessment, laxity in credit assessment, lack of knowledge of processing loan proposals, poor lending practices, government interference and inadequate supervision by the central bank. In addition, Kithinji (2010) proposed that as a result of the stated determinants of credit risk in banks, liquidity, solvency, capital and loan performance problems are happened.

Ahmad & Ariff (2007) pointed out a number of credit risk determinants in banks including, (1) poor screening and monitoring of borrowers (2) rapid loan growth or credit expansion (3) economic down turn that affects the ability of individuals, institutions, and other borrowers' ability to repay their debts.

2.1.7. Components of Credit Risk in Bank's Loan Portfolio

According to Arunkumar & Kotreshwar (2005), there are three main components of credit risk in bank's loan portfolio. These are: (1) transaction risk (2) intrinsic risk (3) concentration risk. (1) Transaction risk focuses on the instability in credit quality and earnings. It results from how the bank underwrites the individual loan transactions. (2) Intrinsic risk also focuses on the risk inherent in certain lines of business and loans in the banks. It is the weakness to historic, predictive and lending risk factors that characterize line of business. (3) Concentration risk is the aggregation of transactions and inherent risk within the portfolio. It may result from loans to one borrower or lines of business.

2.1.8. Credit Risk Assessment and Measurement

Credit risk assessment is the process that relies on the borrower's provided information. It used to identify and control risks, determine the borrower's primary sources of repaying the debt and evaluate the borrower's secondary repayment source will be available or unavailable.

Credit risk measurement is relies on the lender's analytics and risk measurement tools rather than borrower's. It also used to limit the credit risk exposures that the lenders accept when extending the debt, ensure that adequate compensation is earned for risk under taken and mitigate the credit risk exposure by structuring transaction. The three main goals of credit risk measurement when extending business credit in banks are limiting credit risk exposure, earning adequate compensation and mitigating credit risk exposure (Joetta C, 2007).

2.1.9. Credit Risk Management System of Banks

Credit risk management system is very critical to measure and optimizing the profitability of banks. The long- term success of any banking institutions is dependent on effective system that ensures repayments of loans by borrowers. Also it is vital in dealing with asymmetric information problems that used to reduce the level of loan losses (Basel, 2000). Effective credit risk management system involves establishing an appropriate credit environment, operating a sound credit granting process, ensuring

adequate controls over credit risk and maintaining appropriate credit administration, measurement and monitoring process (Catherine & Yussof, 2009). Top management must ensure in managing credit risk that all guidelines are properly communicated throughout the organization and individuals that involved in credit risk management.

Sound credit risk management system include risk identification, measurement, assessment, monitoring and control are policies and strategies(guidelines) which clearly outline the purview and allocation of a bank credit facilities. It is the way in which credit portfolio is managed and how loans were originated, appraised, supervised and collected (Kithinji, 2010). The activity of screening borrowers had widely been recommended and the theory of asymmetric information from prospective borrowers becomes critical in achieving effective screening.

Establishing a clear process for approving new credit, extending existing credit and monitoring credits granted to borrowers are an important when managing credit risk. Covenants, collaterals, credit rationing, loan securitization, long- term customer relationship and syndication are an instruments used by banks to control credit losses. It has also been identified that high quality credit risk management staff are critical to ensure the depth knowledge and judgment of successful managing credit risk in banks (Agyie et al, 2012).

2.1.10. Credit Risk Management Strategies

A credit risk management strategy is the credit philosophy that defines the bank's risk appetite and determines how risks are managed throughout an organization's credit culture (Achou & Tenguh, 2008). It is the basis for how credit risk is monitored, controlled, and responded to. Although risks are inherently a cost of doing business, the successful lender is one that can effectively anticipate such risks and apply mitigating strategies to protect the organization from been harmed by them. The credit risk strategy should be clearly understood by everyone in the credit organization in order to pursue new business opportunities.

The credit risk management strategies are measures employed by banks to avoid or minimize the unfavorable effect of credit risk. A sound credit risk management framework is essential for banks to enhance performance (Fusno *et al.*, 2012). The strategies for hedging credit risk include credit rating (scoring), credit derivatives, credit securitization, and adoption of sound internal lending policy, credit bureau and compliance to Basel accord.

2.1.11. Impacts of Credit Risk Management in Banks

When banks desire to follow good credit risk management policies, practices, strategies or processes, they make profit/ create values. When a bank fails to put in place a good credit risk management, they faced with problems and negative consequences (crisis) associated to them.

This poorly managed practice goes to affect the shareholders and bank values. As a result of poorly managed of credit risk, bank faces different problems like losses or no profitability, capital inadequacy/insolvency, illiquidity and non-performing loans (Gardner, 2007).

The major banking problems have been caused by weaknesses in credit risk management. As a result of poor credit risk management, severe credit losses in a banking system that reflect problems in bank such as concentrations, credit processing and market and liquidity sensitive credit. The banking crisis has directly led to the inadequate managing credit risk by banks and lack of skills amongst loan officers (Eveline, 2010).

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

The active management of credit risk has become a major agenda at banks over the past several years, whereby the lenders now take a proactive approach to individual and credit portfolio transactions. The reason is the increasingly complex credit risk that banks face. Credit providers of all types are exposed to broad range of credit default that can result in large financial losses and that need to be managed in part by quantifying and measuring the potential risk exposures (Joetta C, 2007).

2.1.12. Principles for the Assessment of Banks' Management of Credit risk

A. Establishing an appropriate credit risk environment.

The board of directors should have responsibility for approving and periodically (at least annually) reviewing the credit risk strategy and significant credit risk policies of the bank. The strategy should reflect the bank's tolerance for risk and the level of profitability the bank expects to achieve for incurring various credit risks (Fusno *et al.*, 2012).

Senior management should have responsibility for implementing the credit risk strategy approved by the board of directors and for developing policies and procedures for identifying, measuring, monitoring and controlling credit risk. Such policies and procedures should address credit risk in all of the bank's activities and at both the individual credit and portfolio levels.

Banks should identify and manage credit risk inherent in all products and activities. Banks should ensure that the risks of products and activities new to them are subject to adequate risk management procedures and controls before being introduced or undertaken, and approved in advance by the board of directors or its appropriate committee.

B. Operating under a sound credit granting process

Banks must operate within sound, well-defined credit-granting criteria. These criteria should include a clear indication of the bank's target market and a thorough understanding of the borrower or counterparty, as well as the purpose and structure of the credit, and its source of repayment. Banks should establish overall credit limits at the level of individual borrowers and counterparties, and groups of connected

counterparties that aggregate in comparable and meaningful manner different types of exposures, both in the banking and trading book and on and off the balance sheet. Banks should have a clearly-established process in place for approving new credits as well as the amendment, renewal and re-financing of existing credits.

All extensions of credit must be made on an arm's-length basis. In particular, credits to related companies and individuals must be authorized on an exception basis, monitored with particular care and other appropriate steps taken to control or mitigate the risks of non-arm's length lending (Fusno *et al.*, 2012).

C. Maintaining an appropriate credit administration, measurement and monitoring process.

Banks should have in place a system for the ongoing administration of their various credit risk-bearing portfolios.

In developing their credit administration areas, banks should ensure:

The efficiency and effectiveness of credit administration operations, including monitoring documentation, contractual requirements, legal covenants, collateral, etc.;

- ❖ The accuracy and timeliness of information provided to management information systems;
- ❖ Adequate segregation of duties;
- ❖ The adequacy of controls over all "back office" procedures; and
- ❖ Compliance with prescribed management policies and procedures as well as applicable laws and regulations

Banks must have in place a system for monitoring the condition of individual credits, including determining the adequacy of provisions and reserves (Santomero, 1997).

An effective credit monitoring system will include measures to:

- ❖ Ensure that the bank understands the current financial condition of the borrower or counterparty;
- ❖ Monitor compliance with existing covenants;
- ❖ Assess, where applicable, collateral coverage relative to the obligor's current condition;
- ❖ Identify contractual payment delinquencies and classify potential problem credits on a timely basis; and
- ❖ Direct promptly problems for remedial management

Banks are encouraged to develop and utilize an internal risk rating system in managing credit risk. The rating system should be consistent with the nature, size and complexity of a bank's activities. Banks must

have information systems and analytical techniques that enable management to measure the credit risk inherent in all on- and off-balance sheet activities. The management information system should provide adequate information on the composition of the credit portfolio, including identification of any concentrations of risk.

Banks must have in place a system for monitoring the overall composition and quality of the credit portfolio. Banks should take into consideration potential future changes in economic conditions when assessing individual credits and their credit portfolios, and should assess their credit risk exposures under stressful conditions (Santomero, 1997).

D. Ensuring adequate controls over credit risk

Banks must establish a system of independent, ongoing assessment of the bank's credit risk management processes and the results of such reviews should be communicated directly to the board of directors and senior management. Banks must ensure that the credit-granting function is being properly managed and that credit exposures are within levels consistent with prudential standards and internal limits. Banks should establish and enforce internal controls and other practices to ensure that exceptions to policies, procedures and limits are reported in a timely manner to the appropriate level of management for action. Banks must have a system in place for early remedial action on deteriorating credits, managing problem credits and similar workout situations (Fusno et al., 2012).

E. The role of supervisors.

Supervisors should require that banks have an effective system in place to identify measure, monitor and control credit risk as part of an overall approach to risk management. Supervisors should conduct an independent evaluation of a bank's strategies, policies, procedures and practices related to the granting of credit and the ongoing management of the portfolio. Supervisors should consider setting prudential limits to restrict bank exposures to single borrowers or groups of connected counter parties.

2.1. 13. Factors affecting credit risk management

The financial performance of banks is expressed in terms of profitability and the profitability has no meaning except in the sense of an increase of net asset. Profitability is a company's ability to earn profit on the owner's investment (Warren E. Buffett, 2005). Most organizations exist to earn profit and profitability ratios show a company's overall efficiency and performance. We can divide profitability ratios into parts: Profit margin and returns. Ratios that show margins represent the firm's ability to translate sales dollars into profits at various stages of measurement.

Ratios that show returns represent the firm's ability to measure the overall efficiency of the firm in generating returns for its shareholders (Bessis, 2005). The most popular profitability measurements are: Profit margin on sale, Return investment ratios, and return on equity.

2.1.13.1. Non-Performing Loan Ratio

Non-performing loan ratio is an independent variable and it is chosen because it is an indicator of credit risk management. NPL, in particular, indicates how banks manage their credit risk because it defines the proportion of loan losses amount in relation to total loan amount. The less the ratio the more effective of the credit risk management of banks Afriyie and Akotey (2013). NBE (2012), a non-performing loan is any loan in which interest and principal payments are more than 90 days overdue; or more than 90 days' worth of interest has been refinanced.

2.1.13.2. Capital Adequacy Ratio (CAR)

Capital Adequacy Ratio (CAR) is an indicator of credit management because it is the core measure of a bank's financial strength from a regulator's point of view Abiola (2014). According to Okoth and berhanu, (2013) capital adequacy ratio shows the internal strength of the bank to withstand losses during crisis. Capital adequacy ratio is directly proportional to the resilience of the bank to crisis situations. It has also a direct effect on the profitability of banks by determining its expansion to risky but profitable ventures or areas.

Capital is the cornerstone of a bank's strength. The presence of substantial capital re-assures creditors and engenders confidence in a bank. A bank's capital base (or total capital) is the sum of its Tier 1 and Tier 2 capital Tefera ,(2011). Based on the Basel II accord, Tier I capital consists of shareholders equity and disclosed reserves. Tier II capital consists undisclosed reserves, revaluation reserves, general provisions, hybrid instruments and subordinated term debt. According to Basel accord II requires that the total capital adequacy ratio should not be lower than 8% of capital on the risk weighted average assets of the bank. National bank of Ethiopia under its directive No SBB/24/99 set the minimum capital requirement for the bank to be at least 8% the same to the Basel accord.

2.1.13.3. Liquidity Ratio

Liquidity is another factor that determines the level of bank financial performance. Liquidity refers to the ability of the bank to fulfill its obligations, mainly of depositors. According to Dang (2011) adequate level of liquidity is positively related with bank profitability. Liquidity is ability to provide money on demand. Megeid (2013) observes liquidity as assets readily convertible to cash without loss. Poor liquidity is analogous to a customer having a fever. Kargi (2012) studied that lack of liquidity in extreme situations can lead to the bank's insolvency.

2.1.13.4. Loan Loss Provisions

This is an amount of money that a bank set aside from its annual earnings as a precaution against possible loss of a non performing loan, or to off-set a lost credit facility.LLP shows the anticipated loss of value in the loan portfolio gradually over the periods in which that asset generate income, instead of waiting until the actual loss of asset is incurred. Provision for loan impairment charged to a period is expensed in the income and expense statement Kargi, (2011).

2.1.13.5. Loans and Advance

This is a facility granted to a bank customer that allows the customer make use of banks funds which must be repaid with interest at an agreed period. The interest raised from the loans is the most important source of the banks income. Loan is the most important indicator of profitability in the bank financial statement because they reflect the bank primary activities. Higher in loans and advance, banks profit declined Kenneth (2013). Like the work of Tsehay Bekele (2014), the researcher also describe loan and advance as log of total loan and advance this is because to keep the linearity relation between loan and advance and profitability.

2.1.13.6. Number of Branches

There is a relationship between credit risk management and commercial bank's branch expansion. Credit risk management influenced by bank branches, but the expansion of bank branches is also influenced by the level of deposits in any area. Due to the expansion of number of branches, commercial banks collect huge amount of deposit and this deposit lend to the borrowers. Expansion of branch network also helps commercial banks to manage their credit risk (Campel, 1993).

2.1.13.7. GDP Growth Rate

GDP is one of the major macroeconomic indicators used to measure the health of the economy of a country, and it is a measure of the overall economic output within a country's borders over a particular time, usually a year. Since economic growth and financial sector performance are positively correlated (Levine, 2000), the trend of GDP affects the demand for banks asset. During the declining GDP growth the demand for credit falls which in turn negatively affect the profitability of banks. On the contrary, in a growing economy as expressed by positive GDP growth, the demand for credit is high due to the nature of a business cycle. During boom the demand for credit is high compared to recession (Athanasoglou et al., 2005).

2.1.13.8. Annual Inflation Rate

Inflation is an important determinant of banking performance. High inflation rates are related with high loan interest rates and incomes. The effect of inflation on banking performance depends on whether inflation is predicted or unexpected Nayeem et al.,(2014). If inflation is fully anticipated and interest rates are adjusted accordingly, a positive impact on profitability will result. On the other hand, unanticipated raises in inflation cause cash flow difficulties for borrowers which can lead to premature termination of loan planning and loan losses. The findings of the relationship between inflation and profitability are varied.

2.2. REVIEW OF RELATED EMPIRICAL LITERATURE

2.2.1. Empirical literature in global view

A bank exists not only to accept deposits but also to grant credit facilities, therefore inevitably exposed to credit risk. 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 (Giesecke, 2004). Many researchers in different countries have made investigation on the area of

credit risk management and bank profitability's by considering the importance of the issue of credit risk management policy and profitability of a commercial banking sector.

Fan Li and Yijun Zou (2014) conducted their research to investigate if there is a relationship between credit risk management and profitability of commercial banks in Europe. They also aim to investigate if the relationship is stable or fluctuating. In the research model, ROE and ROA are defined as proxies of profitability while NPLR and CAR are defined as proxies of credit risk management. The research collects data from the largest 47 commercial banks in Europe from 2007 to 2012 and formulates four hypotheses which are related to the research question. A series of statistical tests are performed in order to test if the relationship exists. Other statistical tests are performed to investigate if the relationship is stable or not. The findings reveal that credit risk management does have positive effects on profitability of commercial banks. Between the two proxies of credit risk management, NPLR has a significant effect on the both ROE and ROA while CAR has an insignificant effect on both ROE and ROA.

Chen and Pan (2012) examined the credit risk efficiency of 34 Taiwanese commercial banks over the period 2005-2008. Their study used financial ratio to assess the credit risk and was analyzed using Data Envelopment Analysis (DEA). The credit risk parameters were credit risk technical efficiency (CR-TE), credit risk allocates efficiency (CR-AE), and credit risk cost efficiency (CR-CE). The results indicated that only one bank is efficient in all types of efficiencies over the evaluated periods. Overall, the DEA results show relatively low average efficiency levels in CR-TE, CR-AE and CR-CE in 2008.

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.

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. It 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. Their 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.

Abbas et al.(2014) attempted to examine Credit Risk Exposure and Performance of Banking Sector of Pakistan. This research has taken into account the impact of credit risk on the performance of banking system of Pakistan. Results of fixed effect regression analysis on panel data for period of 2006-2011 has revealed that credit risk measured by ratio of Nonperforming loans to total loan and loan loss provision to non-performing loan negatively affect performance variables of ROA and ROE. Hence the more a bank is facing credit risk the more deterioration in performance it experiences. The effect of increase in ratio of total loan to total deposits significantly increases banks profitability.

Afriyie and Akote, (2013) examined the impact of credit risk management on the profitability of rural and community banks in the Brong Ahafo Region of Ghana. The researcher used the annual financial statements of ten rural banks from the period of 2006 to 2010 (five years) for analysis. The panel regression model was employed for the estimation. In the model, definition of Return on Equity (ROE) and Return on Asset (ROA) were used as profitability indicators while Non-Performing Loans (NLP) and Capital Adequacy Ratio (CAR) as credit risk management indicators. The findings indicate a significant positive relationship between non-performing loans and rural banks' profitability.

Abiola (2014) investigated the impact of credit risk management on the commercial banks performance in Nigeria. Financial reports of seven commercial banking firms were used to analyze for seven years (2005 – 2011). The panel regression model was employed for the estimation of the model. In the model, Return on Equity (ROE) and Return on Asset (ROA) were used as the performance indicators while Non-Performing Loans (NPL) and Capital Adequacy Ratio (CAR) as credit risk management indicators. The findings revealed that credit risk management measured by non-performing loans (NPLs) has positive and significant impact on the profitability of commercial banks' in Nigeria on the other hand capital adequacy ratio (CAR) has positive but insignificant on the profitability of commercial banks' in Nigeria. This finding is unusual because, theoretically NLP is expected to have an inverse relationship with a bank's profitability. The result however, shows a strong positive association between non-performing loans and commercial banks performance.

Muhammad and Garba (2014) evaluated the effect of credit risk management (CRM) on the profitability of Nigerian banks. This paper assesses the effect of credit risk management (CRM) on the profitability of Nigerian banks with a view to discovering the extent to which default rate (DR), cost per loan asset (CLA), and capital adequacy ratio (CAR) influence return on asset (ROA) as a measure of banks' profitability. Data were generated from secondary sources, specifically, the annual reports and accounts of quoted banks from 2002 to 2011. Descriptive statistics, correlation, as well as random-effect generalized least square (GLS) regression techniques were utilized as tools of analysis in the study. The findings establish that CRM as measured by three independent variables (default rate (DR), cost per loan asset (CLA), and capital adequacy ratio (CAR) has a significant positive effect on the profitability of Nigerian banks as indicated by the coefficient of determinations "R² value" which shows the within and between values of 40.89% and 58.35% (which are impressive) while the overall R² is 43.91%, indicating that the variables considered in the model account for about 44% change in the dependent variable, that is, profitability. The study recommends that banks' management should be more scientific (application of risk evaluation techniques) in their credit risk assessment and management of loan portfolios in order to minimize the high incidence of non-performing loans and their negative effect on profitability.

A research by Kaaya and Pastory (2013) on Credit Risk and Commercial Banks Performance in Tanzania: a Panel Data Analysis was meant to find the relationship between the credit risk and bank performance as measured by return on asset. Regression model was used to develop the relationship between the indicators of credit risk and bank performance, the credit risk indicators have produced negative correlation which indicate the higher the credit risk the lower the bank performance. Regression model was statistically fit producing R square and adjusted R square of 70% and 64% respectively. The study recommends the bank understudy to increase the capital reserve to protect the bank for the future losses and to increase bank credit risk management techniques.

Kolapo, Ayeni and Ojo (2012) used panel data regression for the period 2000 to 2010 found that the effect of credit risk on bank's performance measured by the Return on Asset (ROA) of banks is cross section ally invariant. They concluded that the nature and managerial pattern of individual firms do not determine the impact. Also, Hosna, Manzura and Juanjuan (2009) reemphasized the effect of credit risk management on profitability level of banks. They concluded that higher capital requirement contributes positively to bank's profitability. Muhammed, Shahid, Munir and Ahad (2012) used descriptive, correlation and regression techniques to study whether credit risk affect banks performance in Nigeria from 2004 to 2008. They also found that credit risk management has a significant impact on profitability of Nigerian banks.

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

Onaolapo (2012), while analyzed the credit risk management efficiency in Nigerian Commercial banking sector from 2004 through 2009 provides some further insight into credit risk as profit enhancing mechanism. They used regression analysis and found rather an interesting result that there is a minimal causation between deposit exposure and bank's performance.

2.3. Empirical Literature in the Ethiopian Context

In Ethiopia few researchers conducted studies on the impacts of credit risk management on profitability. Among them:

Tseahy Bekekel (2014) conducted the research on impact of credit risk management on banks profitability of public owned commercial banks in Ethiopia by using census sampling method (namely CBB and CB) for the period of 2002-2012. the study employed a multivariate regression model using return on asset (ROA) as dependent variable for measuring the profitability of selected bank and six independent variable. ROA is profitability of public commercial banks (dependent variable) and independent variable, loan loss provision ratio (LPR), loans and advances (LA), nonperforming loan (NPL), cost per loans asset (CLA) and the researcher also used control variable (BS) and deposit (DEP) based on a balanced panel constructed ordinary least squares (OLS) and fixed effects, the study finds that LA and CLA have significant and negative impact on the profitability of commercial banks in Ethiopia. While LPR and NPL were found have a positive but insignificant impact in the study. The remaining two variables, BS and DEP had a positive effect on bank profitability of public commercial bank of Ethiopia. The finding revealed that credit risk management has significant impact on profitability of public commercial banks in Ethiopia.

Tibebu (2011) studies the impact of credit risk management towards the profitability of commercial banks in Ethiopia. The researcher used multiple regression models by taking 11 years data of seven commercial banks in Ethiopia. ROE was used as dependent variable while non performing loan ratio and capital adequacy ratio were used as explanatory variable measuring the level of credit risk in the banks. The results indicate that, both non performing loan ratio and capital adequacy ratio has a negative and significant impact on profitability of commercial banks in Ethiopia.

Tefera (2011) examines impact of credit risk management on profitability of commercial banks in Ethiopia. To examine its impact level the researcher took seven commercial banks purposively that have ten year and above life span in Ethiopia and uses multiple regression models to analyze audited financial report of the sample commercial banks. The researcher use return on equity (ROE) as proxy of profitability measure (dependent variable) and non-performing loan ratio (NPLR) and capital adequacy ratio (CAR) as credit risk management indicator (independent variables) for each bank and in addition to that questioner was also distributed to the authorized bodies in the risk management position of each bank. It argues that credit risk management has significant impact on profitability of commercial banks of Ethiopia. The study recommends that board of directors of each bank and national bank of Ethiopia need to give specially consideration credit risk management policy, and other related things as credit risk management have significant impact on banks profitability.

Girma , (2011) evaluated credit risk management and its impact on profitability in Ethiopian Commercial Banks. The researcher used multiple regression models by taking 10 years data of six commercial banks in Ethiopia .ROA was used as dependent variable while non performing loan ratio, loan loss provisions and loan and advance were used as explanatory variable measuring the level of credit risk in the banks. The results indicate that, both nonperforming loan ratio and loan loss provisos has a negative and significant impact on profitability of commercials banks in Ethiopia.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter presents the methodology parts of the research. And it is divided into five sub sections. The first section states the research design used in the study followed by data type and source, sample design, data analysis technique and finally model and variable measurement.

3.1. Research Design

The researcher employed an explanatory research design so as to examine the effect of credit risk management on profitability of selected private commercial banks in Ethiopia. Explanatory research identifies causal factors and outcomes of the target phenomenon (Anol Bhattacharjee, 2007). It looks for explanation about the nature of relationship between the dependant and independent variables with the help of testing hypothesis which gives understanding about the relationship between variables.

3.2. Data type and sources

This study employed secondary data source with quantitative data type. Secondary data source apply in order to prevent the subjectivity of the primary data (Bourke P, 1989). This secondary data is totally free from subjectivity and biased finding and conclusion. The secondary data was gathered from audited annual financial reports since 2004-2014 from National bank of Ethiopia. Quantitative data types involve counting and measuring of events and performing the statistical analysis of a body of numerical data. The assumption behind the positivist paradigm is that there is an objective truth existing in the world that can be measured and explained scientifically. The main concerns of the quantitative paradigm are that measurement is reliable, valid, and generalizable in its clear prediction of cause and effect (Cassell & Symon, 1994). Finally the data organized as panel data as to suitable for analysis.

3.3. Sampling design

There are about 19 commercial banks operating currently in Ethiopia. From these banks, 17 of them are private commercial banks. To undertake this research, the researcher selected six private commercial banks which have been operated for the last ten years in the banking industry and they are suitable for data collection. These selected banks are Dashen Bank, Awash International Bank, Wegagen Bank, United Bank, NIB International Bank, and Bank of Abyssinia which have potential and better performance among the private commercial banks of Ethiopia. The researcher selected purposive sampling design for this study.

3.4. Data Analysis Techniques

For the data analysis, the researcher used descriptive, correlation and regression analysis techniques. The descriptive statistics used to analyze the data. Descriptive statistics including, mean, median, range, standard deviation, etc. The correlation techniques used to identify the degree of linear association between variables. To test the relationships between the credit risk management variable of selected

private commercial banks in Ethiopia and banks profitability, multiple linear regressions model was run, and thus Ordinary Least Square (OLS) conducted using E-view econometric software package. A multivariate regression coefficient indicates change in dependent variable associated with one unit increase in one independent variable, holding other independent variables constant. The OLS is a regression estimation technique that the least squares regression line of y on x is the line that makes the sum of the squares of the vertical distances of the data points from the line as small as *possible*. The type of the data for this study was panel data including the 10 years of data in the regression analysis. Panel data minimize the bias that can result if individual banks are aggregated. Most existing literature like Kithinji, (2010), Kargi, (2011), Wanjira, (2010), Girma, (2011) and Tsehay, (2014) used return on asset (ROA) as a measure of bank profitability. Hence, researcher also used return on asset as measurement of the bank's profitability proxy.

3.5. Variable Measurement

3.5.1. Dependent Variables

The ultimate goal of any business organization is to earn profit. The same is true for commercial banks. All the activities performed are to realize profit earning objective. One of the most ingredients to earn profit is optimal financial performance. According to (Okoth and berhanu, 2013) and other to measure the financial performance of commercial banks there are variety of ratios used of which Return on Asset and Return on Equity are the major one.

Return on Asset (ROA) - is major ratio that indicates the profitability of a bank. It is a ratio of Income to its total asset (Khravish, 2011). It measures the ability of the bank management to generate income by utilizing company assets at their disposal. In other words, it shows how efficiently the resources of the company are used to generate the income.

It further indicates the efficiency of the management of a company in generating net income from all the resources of the institution (Khravish, 2011). Wen (2010), state that a higher ROA shows that the company is more efficient in using its resources.

Independent Variables

In order to select the explanatory variables, previous studies have been reviewed and literature suggests that non performing loan, loan loss provision , Capital Adequacy, Asset Quality, loan and advance , number of branches and Liquidity Management including macroeconomic variable GDP growth rate and Inflation rate are credit risk management indicators that have significant impact on banks financial performance. These variables are taken into consideration for this study as credit risk management indicators and their description are described as follows:

Non-performing loan ratio - Non-performing loan ratio is an independent variable and it is chosen because it is an indicator of credit risk management. NPL, in particular, indicates how banks manage their credit risk because it defines the proportion of loan losses amount in relation to total loan amount. The less the ratio the most effective of the credit risk management of banks Afriyie and Akotey (2013).

NBE (2012), a non-performing loan is any loan in which interest and principal payments are more than 90 days overdue; or more than 90 days' worth of interest has been refinanced.

Capital Adequacy Ratio (CAR) - Capital Adequacy Ratio (CAR) is an indicator of credit management because it is the core measure of a bank's financial strength from a regulator's point of view Abiola (2014). According to Okoth and Berhanu (2013) Capital adequacy ratio shows the internal strength of the bank to withstand losses during crisis. Capital adequacy ratio is directly proportional to the resilience of the bank to crisis situations. It has also a direct effect on the profitability of banks by determining its expansion to risky but profitable ventures or areas.

Capital is the cornerstone of a bank's strength. The presence of substantial capital re-assures creditors and engenders confidence in a bank. A bank's capital base (or total capital) is the sum of its Tier 1 and Tier 2 capital Tefera (2011). Based on the Basel II accord, Tier I capital consists of shareholders equity and disclosed reserves. Tier II capital consists of undisclosed reserves, revaluation reserves, general provisions, hybrid instruments and subordinated term debt. According to Basel accord II requires that the total capital adequacy ratio should not be lower than 8% of capital on the risk weighted average assets of the bank. National bank of Ethiopia under its directive No SBB/24/99 set the minimum capital requirement for the bank to be at least 8% the same to the Basel accord.

Liquidity Ratio - Liquidity is another factor that determines the level of bank financial performance. Liquidity refers to the ability of the bank to fulfill its obligations, mainly of depositors. According to Dang (2011) adequate level of liquidity is positively related with bank profitability. Liquidity is ability to provide money on demand. Megeid (2013) observes liquidity as assets readily convertible to cash without loss. Poor liquidity is analogous to a customer having a fever. Kargi (2012) studied that lack of liquidity in extreme situations can lead to the bank's insolvency.

Loan loss provisions - This is an amount of money that a bank sets aside from its annual Earnings as a precaution against possible loss of a non-performing loan, or to off-set a lost credit facility. LLP shows the anticipated loss of value in the loan portfolio gradually over the periods in which that asset generates income, instead of waiting until the actual loss of asset is incurred. Provision for loan impairment charged to a period is expensed in the income and expense statement Kargi (2011).

Loans and advances - This is a facility granted to a bank customer that allows the customer make use of bank's funds which must be repaid with interest at an agreed period. The interest raised from the loans is the most important source of the bank's income. Loan is the most important indicator of profitability in the bank financial statement because they reflect the bank's primary activities. Higher in loans and advances, banks' profit declines Kenneth (2013). Like the work of Tsehaye Bekele (2014), the researcher also describes loan and advance as log of total loan and advance this is because to keep the linearity relation between loan and advance and profitability.

Number of branches - There is a relationship between credit risk management and commercial bank's branch expansion. Credit risk management is influenced by bank branches, but the expansion of bank branches is also influenced by the level of deposits in any area. Due to the expansion of numbers of

branch commercial banks collect huge amount of deposit and this deposit lend to the borrowers. Expansion of numbers of branch also helps the commercial banks to manage their credit risk Campel (1993).

GDP growth rate - GDP is one of the primary macroeconomic indicators used to measure the health of the economy of a country, and it is a measure of the overall economic output within a country's borders over a particular time, usually a year. Since economic growth and financial sector performance are positively correlated (Levine, 2000), the trend of GDP affects the demand for banks asset. During the declining GDP growth the demand for credit falls which in turn negatively affect the profitability of banks. On the contrary, in a growing economy as expressed by positive GDP growth, the demand for credit is high due to the nature of business cycle. During boom the demand for credit is high compared to recession (Athanasoglou et al., 2005).

Annual Inflation rate - Inflation is an important determinant of banking performance. High inflation rates are related with high loan interest rates and incomes. The effect of inflation on banking performance depends on whether inflation is predicted or unexpected Nayeem et al.,(2014). If inflation is fully anticipated and interest rates are adjusted accordingly, a positive impact on profitability will result. On the other hand, unanticipated raises in inflation cause cash flow difficulties for borrowers which can lead to premature termination of loan planning and loan losses. The findings of the relationship between inflation and profitability are varied.

3.6. Model Specification

In this section the two basic models for the analysis of panel data, the fixed effects model and the random effects model is introduced. These two panel data models examine group (individual-specific) effects, time effects or both. These effects are either fixed effect or random effect. A fixed effect model examines if intercept vary across groups or time periods, whereas a random effect model explores differences in error variances (Hun M. Park, 2009).

A general linear model for balanced panel data developed by Kurt Schmidheiny (2014) is used to specify the model for this study. Consider the multiple linear regression models for bank $i = 1, \dots, N$ that is observed at several time periods $t = 1, \dots, T$

$$y_{it} = \alpha + x'_{it}\beta + z'_i\gamma + c_i + u_{it}$$

Where y_{it} is the dependent variable, x'_{it} is a k-dimensional row vector of time-varying explanatory variables and z'_i is a M-dimensional row vector of time-invariant explanatory variables excluding the constant, α is the intercept, β is a K-dimensional column vector of parameters, γ is a M-dimensional column vector of parameters, c_i is an individual-specific effect and u_{it} is an individual error term. In this general model, the data generation process assumes the following:

- a. **Linearity:** The model is linear in parameters: α, β, γ , effect c_i and error u_{it} .
- b. **Independence:** independent and identically distributed observations. The observations are independent across individuals but not necessarily across time. This is guaranteed by random sampling of individuals.
- c. **Strict Exogeneity:** The error term u_{it} is assumed uncorrelated with the explanatory variables of all past, current and future time periods of the same individual. This is strong assumption which for instance, rules out lagged dependent variables. Strict Exogeneity also assume that the error term is uncorrelated with the individual specific effect.
- d. **Error variance:** the error variance is assumed to be finite, homoskedasticity and no serial correlation.

In addition to the aforementioned classical linear regression model assumptions, there are also the random effects model and the fixed effects model assumptions.

In the random effects model, the individual-specific effect is a random variable that is uncorrelated with the explanatory variables.

- e. **Unrelated effects:** random effect assumes that the individual-specific effect is a random variable that is uncorrelated with the explanatory variable of all past, current and future time periods of the same individual.
- f. **Effect variance:** random effect also assumes that variance of the individual specific effect is constant.
- g. **Identifiability:** Random effects assume that the regressors including a constant are not perfectly collinear, that all regressors (but the constant) have non-zero variance and not too many extreme values.

In the fixed effects model, the individual-specific effect is a random variable that is allowed to be correlated with explanatory variables.

- h. **Related effects:** The fixed effects explicitly state the absence of the unrelatedness assumption in e above.
- i. **Effect variance:** the fixed effects explicitly state the absence of assumption in f above
- j. **Identifiability:** fixed effects assume that the time-varying explanatory variables are not perfectly collinear, that they have non-zero within variance and do not too many extreme values. Hence X_{it} cannot include a constant or any time-invariant variables.

Based on this general linear regression model, the following specific model is estimated in this study:

$$ROA_{i,t} = \beta_0 + \beta_1 NPL_{i,t} + \beta_2 LLP_{i,t} + \beta_3 LA_{i,t} + \beta_4 CAR_{i,t} + \beta_5 LR_{i,t} + \beta_6 BN_{i,t} + \beta_7 GDP_{i,t} + \beta_8 INF_{i,t} + c_i + \varepsilon_{i,t}$$

Where:

- $ROA_{i,t}$ is dependent variable - Return on Assets
- $NPL_{i,t}, LLP_{i,t}, LA_{i,t}, CAR_{i,t}, LR_{i,t}, BN_{i,t}, GDP_{i,t}$ and $INF_{i,t}$ are time-varying explanatory variables – Non-performing Loan ratio, Loan Loss Provision ratio, Total Loans and Advances(in logarithms), Capital Adequacy Ratio, Liquidity Ratio, Branch Network(in logarithms), Gross Domestic Product(real) and Inflation rate(annual average) respectively.
- β_0 is the intercept and c_i is an individual-specific effect
- $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ and β_8 are model parameters
- ε_{it} is model error term with all the above mentioned assumptions expected to hold.

CHAPTER 4

RESULTS AND DISCUSSION

This chapter presents visual summaries and a careful econometric examination into the relationship exhibited in the collected data in order to meet the objective and to test the hypotheses. The chapter begins with a description of essential information about the sample data using descriptive statistics in 4.1. Correlation analysis among the variables of the model is given in 4.2. Followed by classical linear regression assumptions and diagnostic tests in 4.3. Model selection and regression analysis is given in 4.4 and testing of hypothesis are shown in 4.5

4.1. Descriptive statistics Analysis

Descriptive statistics is used to describe the sample data of each variable in the study with a single value that represents the center of the data, the biggest and smallest data values. It is also used to determine how spread out the data is from the mean.

As it can be seen from table 4.1 below, each variable in this study has equal number of 60 observations (six cross-section over the period from 2005-2014). Therefore, balanced panel data is used in examining the relationship between selected banks profitability as measured by their return on assets and credit risk management as explained by a number of variables. The dependant variable in this study i.e. returns on asset (measure of profitability) with a mean value of 0.041 indicate that selected private commercial banks earn, on average, net profit of 0.041 cents from each birr invested on their respective total assets during the review period. Its standard deviation of 0.0094 indicates lesser spread in the sample data for this variable. A maximum and minimum value of 0.065 and 0.005 indicate that there is a bank that earned a minimum net profit of 0.005 cents from each birr invested on its total asset during the review period. In contrast, there is also a bank that earned a maximum net profit of 0.065 cents from each birr invested on its total asset during the same period.

Table 4.1: Summary of descriptive statistics

	ROA	NPL	LPR	LA	CAR	LR	GDP	INFLN	BN
Mean	0.041134	0.519000	0.038251	3.428018	0.067827	1.144833	0.109400	0.180400	56.383
Median	0.041877	0.480000	0.030000	3.456855	0.058840	1.130000	0.113000	0.166500	49.500
Maximum	0.064868	0.990000	0.227498	3.974495	0.141746	1.260000	0.126000	0.364000	152.000
Minimum	0.005131	0.010000	0.010000	0.477247	0.033259	1.040000	0.085000	0.028000	17.000
Std. Dev.	0.009401	0.314765	0.029956	0.461644	0.025592	0.047745	0.011067	0.106259	29.370
Observations	60	60	60	60	60	60	60	60	60

Source: Eviews 6 outputs based on sample data

Descriptive statistics for the first explanatory variable indicate that the ratio of non-performing loan to total loans of selected private commercial banks ranges from 0.010 to 0.990. These implies that on average selected banks incurred a maximum loan loss of 0.990 birr out of each 1 birr loans provided and a minimum of 0.010 birr out of each 1 birr during the review period. The standard deviation of NPL was 0.3147 which shows the extent to which individual values of NPL in a data set is away from the mean 0.5190 over the last ten years. This indicates NPL has a moderate dispersion around the mean.

Loan loss provision is one of credit risk indicator which is the ratio of loan loss to gross loans of selected banks ranges from 0.01 to 0.23. It indicate that selected private banks, on average, set aside as maximum and minimum amount of as 0.23 cents and 0.01 cents respectively from its annual earnings as a precaution against possible loss of a non performing loan, or to off-set a lost credit facility for each birr of loans provided. With a value of 0.038 that represents the center of the data the ratio spread out from its mean by 0.0299.

Selected private banks granted total fresh loans and advances to the tune of birr 3.48 billion on average over the review period. Nevertheless, there is a bank that granted fresh loan to the tune of as maximum as birr 3.97 billion in a given year during the study period. There is also a bank that granted as minimum loan as birr 0.477 billion in a given year during the same period. There is a very high variation range between 3.97 billion and 0.477 billion. The mean of the total loan equals 3.43 billion. This indicates on average, from the total asset of the bank 3.43 billion is kept in terms of loan.

The ratio of total capital to risk weighted assets of selected banks ranges from maximum of 0.03 and a minimum of 0.14. The descriptive statistics of CAR indicate that the mean value of 0.068 representing the center of the data and the ratio spread out from its mean by 0.026.

Similarly, the ratio of current asset to total loans of selected banks ranges from 1.04 to 1.26 during the review period. A liquidity ratio of more than one in this particular case indicate that selected private banks have a sufficient amount of current assets to meet their short term financial obligations(current liabilities) as they become due during the review period. With its mean value of 1.14 the ratio deviates from its average value by 0.04.

During the review period, each selected private banks have on average about 56 branch networks. Apart from this there is a bank that opened as many as 152 branches and there is also a bank that opened as small as 17 branches in a given year during the review period. On average variable is deviate from its mean by 29.

The average value of inflation over the last ten years was 0.18 and the maximum value of inflation variable was 0.36 and the minimum value of inflation during the last ten years was 0.028. The variation of each individual data of inflation variable to the mean during the last ten years which is represented by the standard deviation was 0.106.

The mean and other descriptive outputs of GDP variable were computed as a natural logarithm of gross domestic product at current market prices in order to make more linearity. The mean

value of GDP over the last ten years was 0.109 the maximum value of inflation variable was 0.36 and the minimum value of inflation during the last ten years was 0.028 and the standard deviation of inflation 0.106. This shows the existence of low variation of each Individual data of GDP to the mean during the last ten years comparing with the standard deviation of inflation variable.

4.2. Correlation Analysis

Correlation analysis is a statistical tool which is used to measure the strength or degree of linear association between two variables. The correlation coefficient, which always lays between -1 and +1, was used to measure the strength and magnitude or degree of linear association between two series. A correlation coefficient of +1 shows a strong and positive linear relationship between two variables. On the contrary, a correlation coefficient of -1 indicates a strong and negative linear association between two series (Brooks, 2008). A correlation coefficient of zero shows that there is little or no linear relationship between two variables. The coefficient can be either negative or positive.

Table 4.2: Correlation Coefficient Matrix

Variables	ROA	NPL	LPR	LA	CAR	LR	GDP	INFLN	BN
ROA	1.000000								
NPL	-	1.000000							

	0.242035								
LPR	-0.063197	0.069184	1.000000						
LA	0.127049	-0.113604	-0.056876	1.000000					
CAR	-0.041097	-0.101760	-0.110859	-0.148727	1.000000				
LR	0.492620	0.132279	0.067210	0.025909	0.542302	1.000000			
GDP	0.124121	0.102243	0.129174	-0.293481	0.073155	-0.117270	1.000000		
INFLN	-0.027873	-0.083739	-0.037574	0.214337	-0.042639	0.125861	-0.630378	1.000000	
BN	0.306002	0.027904	0.151442	0.553335	-0.237073	0.121310	-0.260101	0.159297	1.000000

Source: Eviews 6 outputs based on sample data

The correlation coefficient matrix table above shows that four of variables such as loan and advance, liquidity ratio, GDP and number of branch were positively correlated with ROA. And the remaining variables such as non performing loan, loan loss provision capital adequacy ratio and inflation were negatively correlated to ROA. The result of correlation analysis is discussed in detail as follows:

The coefficient of correlation between ROA and non performing loan was -0.242035. It shows that there is negative relationship between them and also it means that when 100% increase in nonperforming loan decrease return on asset by 0.242035. The coefficient of correlation between ROA and loan provision ratio -0.063197. This figure reveals that there is weak and negative relationship between ROA and loan loss provision over the last ten years. It further indicates that when credit function is increased by 100% ROA will be decrease by 0.063197. The coefficient of correlation between ROA and capital adequacy ratio was -0.041097. This shows that weak and negative relationship between capital adequacy ratio and ROA. ROA is decreased by 41.1% when capital adequacy ratio is increased by 100%. The coefficient of correlation between ROA and inflation was -0.027873. The figure shows that there is weak and negative relation between ROA and inflation and ROA is decrease by 2.78% if inflation is increased by 100%. Beside that the regression results shows that loan and advance of selected private commercial banks of Ethiopia is significantly positive related to return on asset by 0.127049. The figure indicates that an increase of loan and advance by 100% will result in an increase of ROA by 12.7%. The coefficient of correlation between ROA and liquidity ratio was 0.49260. The parameter value shows that 100% increase in liquidity ratio increase return on asset by 49.26%. In addition that the coefficient of correlation between ROA and branch number was 0.306002. The results shows that 100% increase in branch

numbers increase ROA by 30.60%. The coefficient of correlation between ROA and inflation was -0.02783. The figure shows that if inflation is increased by 100%, ROA will decrease by 2.783%. The coefficient of correlation between ROA and GDP was 0.124121. This shows the relationship between ROA and GDP is positive. The figure indicates that an increase of GDP by 100% will result in an increase of ROA by 12.41%.

Nonperforming loan variable was positively correlated to LLP and CAR with correlation Coefficient of 0.254 and 0.067 respectively. On the contrary, it was negatively correlated with LA, LR, BN, GDP and inflation by having correlation coefficient of -0.537, -0.279, -0.642, -0.709, and -0.296 respectively. Loan loss provision was positively correlated with LR and BN with correlation coefficient of 0.067 and 0.063 respectively. Whereas it was negatively correlated with LA, CAR, inflation and GDP with correlation coefficient of -0.051, -0.0111, -0.041 and -0.122 respectively.

Loan and advance variable was positively correlated to BN, GDP and inflation with correlation coefficient of 0.787, 0.692 and 0.202 respectively. On the contrary, it was negatively correlated with LA and LR by having correlation coefficient of -0.464 and -0.029 respectively. Capital adequacy ratio was negatively correlated with BN, GDP and inflation with correlation coefficient of -0.291, -0.051 and -0.046 respectively. CAR was positively correlated with LR with a correlation coefficient of 0.542. Liquidity ratio was positively correlated with BN, GDP and inflation with a correlation coefficient of 0.108, 0.319 and 0.031 respectively. Branch number was positively correlated with GDP and inflation with the coefficient of 0.918 and 0.105 respectively.

4.3 Assumptions of the Classical Linear Regression Model and Diagnostic Tests

The five basic assumptions relating to the linear regression model (CLRM) were made in this study. The assumptions were as follows: the mean of the error term for all X is (independent variables) are zero $\{E(u_t) = 0 \text{ for all } u_t\}$, the assumption of homoscedasticity (no heteroscedasticity) which assumes that the variance of the error is constant $\{\text{var}(u_t) = \sigma^2 < \infty \text{ for all } u_t\}$, assumption of non autocorrelation assumes that 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 $\{\text{cov}(u_i, u_j) = 0 \text{ for } i \neq j\}$, the assumption of normality says the disturbances are normally distributed $\{u_t \sim N(0, \sigma^2)\}$ and the assumption of multicollinearity. Test of these assumption were required to show the fulfillment of desirable properties of estimation technique and to ascertain the validity of hypotheses test results on the coefficient estimates. The diagnostic tests were made by the researcher before running the regression model, which says the return on asset was a function of independent variable such as

nonperforming loan, loan loss provision, loan and advance, capital adequacy, liquidity ratio, number of branch , inflation and GDP, to ensure that the data fits the basic assumption of classical linear regression model.

Test for Average Value the Error Term is Zero ($E(u_t) = 0$)

The test for the mean of the error term is zero is the first diagnostic test conducted in the study.

According to Brooks (2008) the existence of constant term in the regression equation will prevent the violation of the assumption the average value of errors is zero. Because the equation

or multiple regression model developed in this study included the constant term the assumption of the mean value the error term is zero was not violated.

Test for No Heteroscedasticity (Homoscedasticity) $\{var(u_t) = \sigma^2 < \infty\}$

The researcher has tested the assumption no heteroscedasticity which assumes that the variance of the error term is the same for all observations. As it is shown in from table 4.3, the Fstatistic

and Chi-Square versions of the test statistic give the same conclusion that there is no evidence for the presence of heteroscedasticity, since the p-values are considerably in excess of 0.05 (Gujarat, 2004). The third version of the test statistic, Scaled explained SS', which as the name suggests is based on a normalized version of the explained sum of squares from the auxiliary regression, also suggested the same conclusion that there is evidence for the presence of heteroscedasticity since the p-value was greater than 0.05. Thus it concluded that the test has no heteroscedasticity problem in the study.

Table 4.3:Heteroskedasticity Test: White

F-statistic	1.372482	Prob. F(8,51)	0.2310
Obs*R-squared	10.62912	Prob. Chi-Square(8)	0.2236
Scaled explained SS	14.62211	Prob. Chi-Square(8)	0.0669

Source: Eviews 6 outputs based on sample data

Test for Assumption of No Autocorrelation { $cov(u_i, u_j) = 0$ for $i \neq j$ }

The diagnostic test for CLRM assumption of no autocorrelation was tested by this study. According to Gujarati (2004) the assumption of no autocorrelation between the disturbances assumes that given any two X values, X_i and X_j ($i \neq j$), the correlation between any two u_i and u_j ($i \neq j$), is zero. According to Chris Brooks (2008) it is assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are autocorrelated or that they are serially correlated. This assumption was tested by Durbin Watson (DW) test of autocorrelation. Durbin-Watson (DW) is a test for first order autocorrelation -- i.e. it tests for a relationship between an error and its immediate previous value. One way to motivate the test and to interpret the test statistic would be in the context of a

regression of the time t error on its previous value

$$u_t = \rho u_{t-1} + v_t$$

Where $v_t \sim N(0, \sigma^2 v)$ and ρ is the coefficient of autocorrelation. The DW test statistic has as its null and alternative hypotheses. Under the null hypothesis, the errors at time $t-1$ and t are independent of one another (the errors at time $t-1$ and t are uncorrelated), and the alternative hypothesis says the errors at time $t-1$ and t are independent (the errors at time $t-1$ and t are serially correlated). Therefore

$$H_0 : \rho = 0 \text{ (no autocorrelation)}$$

$$H_1 : \rho \neq 0 \text{ (autocorrelation)}$$

DW has 2 critical values: an upper critical value (d_U) and a lower critical value (d_L), and there is also an intermediate region where the null hypothesis of no autocorrelation can neither be rejected nor not rejected! The rejection, non-rejection, and inconclusive regions are shown on the number line in figure 4.1

Figure 4.1 Rejection and Non-Rejection Regions for DW Test

Reject H_0 :	Do not reject H_0 :	
Positive H_0 :	no evidence of	negative
Autocorrelation	autocorrelation	autocorrelation

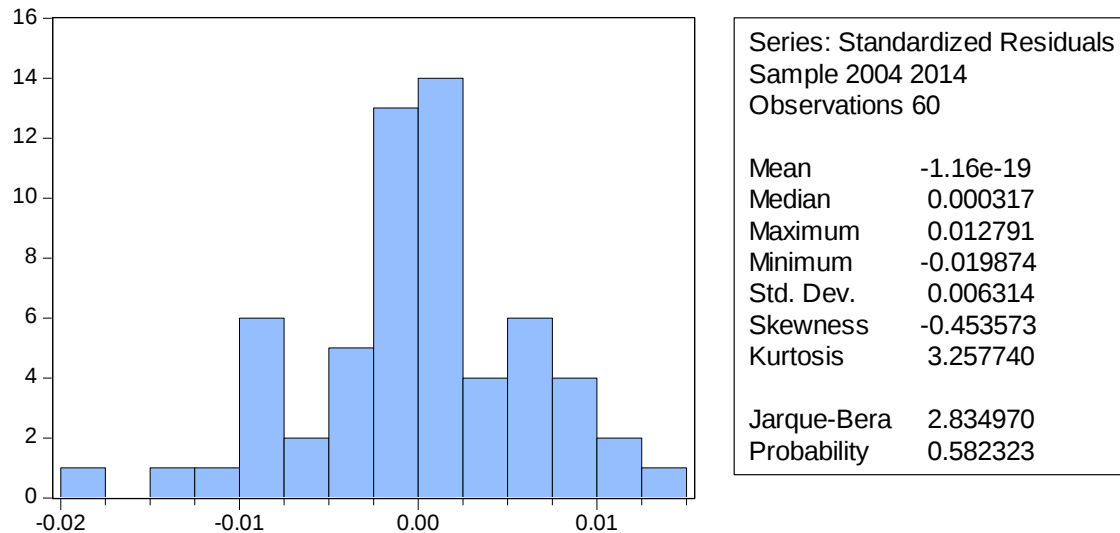
	Inclusive		Inclusive	
0	di	du	4-du	4-di
				4

Table 4.5 result Durbin-Watson test value for the autocorrelation of residual which is 2.254 which is very close to 2; therefore without going through the above analysis it can be easily judged that there is no problem of autocorrelation.

Test of Normality Assumption $\{ut \sim N(0, \sigma^2)\}$

The fourth diagnostic test for CLRM assumption of normality assumption was tested by this study. The assumption says that disturbances are normally distributed. According to Chris Brooks (2008), one of the most commonly applied tests for normality is the BeraJarque test. BeraJarque 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. The standardized third and fourth moments of a distribution are known as its skewness and kurtosis. Skewness measures the extent to which a distribution is not symmetric about its mean value and a normal distribution is symmetric about its mean, while a skewed distribution will not be. Kurtosis measures how fat the tails of the distribution are. A normal distribution is not skewed and is defined to have a coefficient of kurtosis of 3. This assumption is required in order to conduct hypothesis testing, particularly if the sample size is small. For sample sizes that are sufficiently large, violation of the normality assumption is virtually inconsequential (David Kreiberg, 2009). If the residuals are normally distributed, the histogram should be bell-shaped and the Bera-Jarque statistic would not be significant. This means that the p-value should be bigger than 0.05 to not reject the null of normality at the 5% level. The normality test for this study as shows in figure 4.2 the kurtosis is close to 3 ,and the Jargue-Bera statistic has a p-value of 0.582323 which is above 0.05 indicate that the data were consistent with a normal distribution assumption.

Figure 4.2: Normality test of OLS regression residuals



Test for Absence of Multicollinearity Assumption

The last CLRM assumption tested in this study was the absence of multicollinearity assumption.

According to Chris Brooks (2008) the absence of multicollinearity assumption says that the explanatory variables are not correlated with one another. If there is no relationship between the explanatory variables, they would be said to be orthogonal to one another. If the explanatory variables were orthogonal to one another, adding or removing a variable from a regression equation would not cause the values of the coefficients on the other variables to change. A small

degree of association between explanatory variables will almost always occur but will not cause

too much loss of precision. However, a problem occurs when the explanatory variables are very highly correlated with each other, and this problem is known as multicollinearity. Perfect multicollinearity occurs when there is an exact relationship between two or more variables. In this case, it is not possible to estimate all of the coefficients in the model. Perfect multicollinearity will usually be observed only when the same explanatory variable is inadvertently used twice in a regression. This assumption requires that none of the explanatory variables in the model be correlated with any other explanatory variable or with any linear combination of those explanatory variables. This assumption is very important and necessary for estimation. If the explanatory variables in the model are perfectly linearly correlated (i.e., if the correlation coefficient = 1), the parameters of the model become indeterminate and the method of OLS breaks down (Mukras, M.S,1993). However, if each of the explanatory variables is linearly independent of all the others or any linear combination of all of the variables, no estimation difficulty will arise as the variables are orthogonal to each other.

According to Cooper and Schendler (2009) the correlation coefficient between independent variable up to 0.8 may not cause series multicollinearity problem therefore, coefficient of correlation less than 0.8 is acceptable. According to Hair et al (2006), the correlation coefficient between independent variable should not exceed 0.9 which means coefficient of correlation less than 0.9 is acceptable. Therefore in this study the correlation matrix for eight of the independent variable is shows below in table 4.4. The result of correlation matrix shows that the maximum coefficient of correlation between two independent variables in this study was 0.55335 which is between number of branch and loan and advance. This coefficient of correlation does not violate the acceptable level stated by Hair et al (2006),Cooper and Schendler (2009). Therefore, there is no multicollinerity among the independent variables in the study.

Table 4.4 MulticollinearityTest.

Variables	NPL	LPR	LA	CAR	LR	GDP	INFLN	BN
NPL	1.000000							
LPR	-0.069184	1.000000						
LA	-0.113604	-0.056876	1.000000					
CAR	-0.101760	-0.110859	-0.148727	1.000000				
LR	0.132279	0.067210	0.025909	0.542302	1.000000			
GDP	0.102243	0.129174	-0.293481	0.073155	-0.117270	1.000000		
INFLN	-0.083739	-0.037574	0.214337	-0.042639	0.125861	-0.630378	1.000000	
BN	0.027904	0.151442	0.553335	-0.237073	0.121310	-0.260101	0.159297	1.000000

Source: E-view 6 outputs based on sample data

4.4. Regression Results

In order to estimate the linear regression model in this study: The model looks like:

$$ROA_{i,t} = \beta_0 + \beta_1 NPL_{i,t} + \beta_2 LLP_{i,t} + \beta_3 LA_{i,t} + \beta_4 CAR_{i,t} + \beta_5 LR_{i,t} + \beta_6 BN_{i,t} + \beta_7 GDP_{i,t} + \beta_8 INF_{i,t} + c_i + \varepsilon_{i,t} \dots \dots \dots (4.1)$$

Selecting appropriate model is very important. One interpretation of the individual-specific effects, c_i , is that they represent ignorance about all of the other systematic factors that predict ROA other than NPL, LLP, LA, CAR, LR, BN and INF. The table 4.5 shows the relationship between dependant variable ROA and independent variable and how the regression results are virtually depicted by the researcher. There are broadly two classes of panel estimator approaches that can be employed in panel data financial research: fixed effects models (FEM) and random effects models (REM) (Brooks 2008). If this two approaches end up with nearly the same results, there are situations that they will deviate widely. The fixed effects and the random effects models both have potential advantages - as well as disadvantages – to consider when selecting an approach. The fixed effects model will produce unbiased estimates of parameters, but those estimates can be subject to high sample-to-sample variability (Tom S. Clark and Drew A. Linzer, 2014). The random effects model will, except in rare circumstances, introduce bias in estimates of parameters, but can greatly constrain the variance of those estimates. For this study the researcher used the fixed effects model since the number of repressors is greater than the number of cross sections and the results presented as follow.

Table 4.5 Regression Results

Dependent Variable: ROA

Method: Panel Least Squares

Date: 05/23/15 Time: 06:17

Sample: 2004 2014

Periods included: 11

Cross-sections included: 6

Total panel (unbalanced) observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.089118	0.041724	-2.135916	0.0380
NPL	-0.002466	0.003363	0.733060	0.4672
LPR	-0.066771	0.036187	-1.845200	0.0715***
LA	-0.002494	0.002682	-0.930057	0.3572

CAR	-0.133580	0.057494	-2.323350	0.0246**
LR	0.133904	0.035396	3.783056	0.0004*
GDP	0.053949	0.117860	-0.457741	0.6493
INFLN	-0.010236	0.011586	-0.883503	0.3816
BN	6.36005	4.27005	1.491918	0.1425

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.548873	Mean dependent var	0.041134
Adjusted R-squared	0.421381	S.D. dependent var	0.009401
S.E. of regression	0.007151	Akaike info criterion	-6.842085
Sum squared resid	0.002352	Schwarz criterion	-6.353405
Log likelihood	219.2626	Hannan-Quinn criter.	-6.650936
F-statistic	4.305149	Durbin-Watson stat	2.253652
Prob(F-statistic)	0.000111		

Note : *, **, ***: denotes 1% 5% and 10% significant level respectively

Source: output of E-view 6 based on sample data

After running this equation using Eview 6, the regression model was as follows.

$$\text{ROA} = -0.089 - 0.002466\text{NPL} - 0.06671\text{LPR} - 0.002494\text{LA} - 0.133580\text{CAR} + 0.133904\text{LR} + 0.053949\text{GDP} - 0.010236\text{INFLN} + 6.36005\text{BN}$$

The results of the above model as follows, the constant variable indicated that if the private commercial bank fails to extend credit it will incur loss of 0.089. The regression results shows that, liquidity ratio , GDP, and number of branch had positive coefficients. Nonperforming loan, loan loss provision, loan and advance, capital adequacy ratio and inflation had negative coefficient. The coefficient of NPL is - 0.002466. Contrary to the researcher's expectation, non-performing loans ratio is found to have no statistically significant impact on return on asset of selected private commercial banks. The result indicates that 100% increase NPL of private commercial banks decrease ROA by 2.2466% even if this relation is not significant. Unlike a study by Tseahy Bekekel (2014) which found that loan loss provision has a significant positive impact on profitability of public commercial in Ethiopia, the current study found a negative and statistically significant impact on profitability. The researcher supposes that this might be

because unlike public commercial banks which finance very risky long-term projects, the bulk of loans and advances of selected private banks goes to non-risky sectors like trade. Therefore, non-performing loan is very small. So if these banks keep aside a lot of money as a provision of loan loss, their profit will decrease. The coefficient of LLP is -0.06671 indicate that LLP had significant negative relation with ROA. The result suggests that 1% increase in LLP of private commercial banks decrease ROA by 6.67%. Loan loss provision is significant at 10%. The magnitude of loan and advance coefficient has negative effect on return on asset even though the relation is not significant. The coefficient of LA is -0.002494 which shows that 1% increase in LA decrease ROA by 2.49%. Capital adequacy ratio has a statistically significant negative impact on return on assets of selected private commercial banks. Thus, the increase in capital adequacy ratio of selected private banks by 1% point causes a decrease of 13.36% point of return on assets of these banks. CAR is significant at 5% level of significance. Liquidity ratio has a statistically significant positive impact on return on assets of selected private banks. Consequently, the increase in the liquidity ratio of selected private banks by 1% point causes an increase of 13.39% point of return on assets of these banks. The coefficient of LR is positive and highly significant at 1% level of significance. GDP is macroeconomics variables which had a coefficient of 0.05395 which indicate 1% increase in GDP cause 5.395% increase in ROA even if not significant. The magnitude of inflation had a coefficient of -0.010236 which shows that INFL and ROA had negative relation with each other and 1% increase inflation cause a decrease of 10.24% of ROA. The last explanatory variable is number of branch which expressed (in logarithms) of selected private commercial banks have no statistically significant impacts on their return on assets. The R-squared from the estimation result indicate that the model explains 54.88 of the variation in the ROA of selected private commercial banks operating in the country. The F-statistic with its probability is usually used to test the global significance of the model. In this case, it indicates that coefficients included in the estimation are jointly significant. The F-statistic is a test of the null hypothesis that explanatory variables in the model are not jointly significant. null hypothesis of F-statistic (the overall test of significance) which says the Adjusted R-squared is equal to zero was rejected at 1% significance level. In this case the Probability (F-statistic) with 0.00011 values indicates that strong statistical significance which enhanced the reliability and validity of the model. The Durbin-Watson statistics of 2.25 in its part indicate that the estimated model is free from the problem of serial correlation in the residuals.

4.5. Testing of Hypothesis

The following section provides the results for each explanatory and control variables and their importance in determine the profitability of private commercial banks in Ethiopia through testing hypothesis.

Hypothesis 1:

Ho: There is no significant relationship between non- performing loans and bank's

Profitability

H1: There is significant relationship between non- performing loans and bank's Profitability

The results of fixed effects model in table 4.5 indicates that nonperforming loan has -0.002466 beta coefficients, which shows that if nonperforming loan is increased by 1%, return on asset will be decrease 2.466% by controlling other factors constant. Since the beta coefficient of nonperforming loan has a negative sign, nonperforming loan has a negative impact on profitability of private commercial banks measured in terms of ROA. The level of nonperforming loan at risk profitability has a negative relationship with profitability of private commercial banks but the relation was found to be insignificant (p=0.4672). Therefore, it is not possible to reject the null hypothesis. The finding is consistent with Abbas et al., (2014), Abiola (2014), (Tefera, 2011). The finding is inconsistent with Boahene, dasah and Agyei, (2012), Tsehay, (2014)

Hypothesis 2:

H0: There is no significant relation between loan loss provisioning and profitability.

H1: There is significant relation between loan loss provisioning and profitability.

From table 4.5, the results indicate that loan loss provision has a coefficient of -0.066771 which indicate that if loan loss provision increase by 1% return on asset decrease by 6.677% by controlling other factors constant. Since the coefficient has a negative sign, loan loss provision has negative impact on the profitability of private commercial banks of Ethiopia. Loan loss provision is statically significant at 10% significant level because the p-value of loan loss provision is 0.0715. Therefore, the null hypothesis was rejected in the study because loan loss provision has a negative significant impact on profitability of private commercial banks. Therefore loan loss provision has a great influence for the decline of profitability of private commercial banks in Ethiopia. The finding is consistency with Felix and Claudine, Ahmad and Ariff, (2007) and inconsistency with Ahmed, Tekeda and Shawn (1998), Abiola, (2014)

Hypothesis 3:

H0: There is no significant relationship between loans and advances and bank's

Profitability

H1: There is significant relationship between loans and advances and bank's

Profitability

The results of the fixed effects estimate indicate in table 4.5 that loan and advance has a beta coefficient of -0.002494 which shows that loan and advance have a negative relation with the profitability of private commercial banks in Ethiopia even if their relation is insignificant. The beta coefficient -0.002494 indicate that 1% increase in LA cause 2.494% decrease in return on asset of private commercial banks of Ethiopia. Loan and advance is not significant because the p-value was 0.3572 which is above 10% level

of significance. Therefore, it not possible to reject the null hypothesis. The study was inconsistency with Tsehay Bekele(2014) and consistency with Kargi, (2011).

Hypothesis 4:

Ho: There is no significant relation between Capital adequacy and bank's profitability

H1: There is significant relation between Capital adequacy and bank's profitability

Capital adequacy ratio is one of specific independent variable, which can be controlled by the management of private commercial banks the other dependant variable, used and hypothesized in the study. The beta coefficient of capital adequacy was -0.133580 which indicates that if the capital adequacy of private commercial banks increases by 1%, the private commercial banks profitability will decrease by 13.358% by controlling other factors constant. Again, this indicates that CAR has a negative impact on profitability of the private commercial banks in Ethiopia which is measured by ROA. The results of fixed effects model in table 4.5 indicate that capital adequacy has a negative relation with profitability of private commercial banks and statically significant (p-value 0.0246) at 5% level. Therefore, the researcher reject the null hypothesis. The finding was accordance with the expected sign which is stated that there is significant negative relation between capital adequacy ratio and profitability of private commercial banks in Ethiopia. Therefore, there is statistically significant relationship between capital adequacy ratio and profitability of selected private banks. The finding is consistency Afriyie and Akote (2013) and inconsistency with Abiola (2014)

Hypothesis 5:

Ho: There is no significant relation between liquidity ratio and bank's profitability

H1: There is significant relation between liquidity ratio and bank's profitability

The results of the table 4.5 indicate that liquidity ratio has a coefficient of 0.0246 which shows that liquidity ratio and profitability of selected private banks had a positive relation other thing remain constant. The direct relation between liquidity ratio and profitability indicate that 1% increase in liquidity ratio increase profitability of selected private commercial banks by 2.46%. Liquidity ratio is statically significant at 1% level of significant because the p- value is 0.004 which less than 1%. Therefore, the null hypothesis was rejected in the study because of that liquidity ratio has a positive significant impact on profitability selected private banks. Therefore liquidity ratio has a great contribution for the raise of profitability of selected private banks. The finding is inconsistency with Bourke, (19890), (Kithinji, 2010).

Hypothesis 6:

H0: There is no significant relation between numbers of branch and bank profitability

H1: There is significant relation between numbers of branch and bank profitability.

From the result of table 4.5 regression indicate that number of branch has a positive relation with profitability of selected private banks even if the variable is statically insignificant (p- value 0.1425). The beta coefficient of number of branch was 6.336 and the relation with profitability was positive. Thus, the probability of committing type 1 error as indicated in p-value is very high, it is not possible to reject the null hypothesis. The study was consistence with Tsehay Bekele (2014) and Campel (1993).

Hypothesis 7:

H0: There is no significant relationship between annual GDP growth rate and banks profitability

H1: There is significant relationship between annual GDP growth rate and banks profitability.

Gross domestic product was the macroeconomic (external) variable which is beyond the control of management of selected banks. GDP variable was used and hypothesized in the study. From the table 4.5 it is shown that GDP has 0.054 beta coefficients, which shows that if GDP is increased by 1%, return on asset will be increased by 5.4% by controlling other factors constant. Since the beta coefficient of GDP has a positive sign, GDP has a positive impact on profitability of selected private banks which has a proxy of ROA. GDP is statistically insignificant because the p-value of GDP was 0.6493. Therefore, the null hypothesis is not possible to reject study. Therefore; GDP has a contribution for the raise of profitability of the selected private banks even though statically insignificant. The finding is consistence with Demircuc-Kunt and Huizinga, (1999), Bikker and Hu, (2002) and Tang and Jiang, (2003).

Hypothesis 8:

H0: There is no significant relation between annual inflation rate and banks profitability.

H1: There is significant relation between annual inflation rate and banks profitability.

Inflation was another macroeconomic (external) variable which is beyond the control of the management of selected private commercials. As shown from table 4.5 inflation has beta coefficient of -0.010236, which shows that an increase in the inflation at 1% will decrease the profitability by 10.236% which is measured by return on asset by controlling other factors constant. The negative sign of beta coefficient of inflation variable has indicates that inflation has a negative impact on profitability of selected private banks. However, inflation is statistically not significant even at 10% significance level because the p-value of inflation was 0.3816 which is greater than 10%. Therefore, the researcher failed to reject the null hypothesis because according to the finding of the study, inflation has no impact on profitability selected

private commercials. The finding is inconsitance with Molyneux and Thorton, (1992), Hassan and Bashir, (2003), Kosmidou, (2006), Kyriaki, (2012) and Nayeem et al., (2014)

Table 4.6 Summary of Hypothesis and Results

No	Hypothesis	p-value	Discussion
1	There is no significant relationship between non- performing loans and bank's Profitability	0.4672	Accept H0
2	There is no significant relation between loan loss provisioning and profitability.	0.0715	Reject H0
3	There is no significant relationship between loans and advances and bank's Profitability	0.3572	Accept H0
4	: there is no significant relation between Capital adequacy and bank's profitability	0.0246	Reject H0
5	there is no significant relation between liquidity ratio and bank's profitability	0.0004	Reject H0
6	There is no significant relation between numbers of branch and bank profitability	0.6493	Accept H0
7	There is no significant relationship between annual GDP growth rate and banks profitability	0.3816	Accept H0

8	There is no significant relation between Annual inflation rate and profitability.	0.1425	Accept H0
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CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

This part of the study has two sections. The first section presents the conclusion drawn from the data analysis and discussion. The second section presents the recommendation forwarded based on the conclusion of the study.

5.1. Conclusions

The main aim of the study is to analyze the impact of credit risk management on the profitability of selected private commercial banks as measured by ROA. The researcher purposively selected six private commercial banks: DB, AIB, BoA, WB, UB and NIB as a center of analysis and a balanced panel data over a period from 2005-2014.

The study used a descriptive analysis, correlation analysis and multiple regressions. In the descriptive analysis, simple descriptive statistics and correlation analysis are used to learn something meaningful about the sample data before a formal empirical investigation. As far as the econometric study is concerned, the period from 2005-2014 is considered to quantify the extent to which the credit risk management variables like NPL, LLP, LA, CAR, LR, NB, INFL and GDP have affected selected banks' profits. The study selected the fixed effects model to estimate the relationship between the dependent variable (ROA) and the independent variables.

The descriptive statistics show that pertaining to company-specific (internal) variable, number of branches has the highest mean value which is 56.38 and loan loss provision has the least mean value which is

0.038. Number of branch is the highest volatile variable which has the standard deviation of 29.37 and capital adequacy ratio is the lowest volatile variable which has the standard deviation of 0.025592. Regarding to the macroeconomic variables, inflation has the highest mean value which is 0.180 and GDP has the least mean value which is 0.1090 inflation is the highest volatile variable which has the standard deviation of 0.106 and GDP is the least volatile variable which has the standard deviation of is 0.011. Generally the mean values of all variables ranges from the least value of 0.011 GDP to the highest mean value of 46.5 of number of branch variable. Whereas the standard deviation of all variables ranges from the least value of 0.0110 for credit function (which shows credit GDP is the least volatile variable) to the highest value of 29.37 number of branch which indicates number of branch is the highest volatile variable.

Correlation analysis indicates that ROA was not positively correlated with any of the independent variables with a coefficient greater than 0.5. Loan and advance, liquidity ratio, GDP, and number of branch were positively correlated with ROA with 0.127049, 0.49262, 0.12412, and 0.3060 correlation coefficients respectively. However, nonperforming loan, loan loss provision, capital adequacy ratio and inflation were negatively correlated with ROA with correlation coefficient of 0.242035, 0.063197, 0.041097 and 0.027873.

Nonperforming loan variable was positively correlated to LLP and CAR with correlation Coefficient of 0.254 and 0.067 respectively. On the contrary, it was negatively correlated with LA, LR, BN, GDP and inflation by having correlation coefficient of -0.537, -0.279, -0.642,-0.709 ,and -0.296 respectively. Loan loss provision was positively correlated with LR and BN with correlation coefficient of 0.067and 0.063respectively. Whereas it was negatively correlated with LA,CAR, inflation and GDP with correlation coefficient of -0.051, -0.0111, -0.041and -0.122 respectively. Loan and advance variable was positively correlated to BN, GDP and inflation with correlation coefficient of 0.787, 0.692 and 0.202 respectively. On the contrary, it was negatively correlated with LA and LR by having correlation coefficient of -0.464 and -0.029 respectively. Capital adequacy ratio was negatively correlated with BN, GDP and inflation with correlation coefficient of-0.291, -0.051 and -0.046 respectively. CAR was positively correlated with LR with a correlation coefficient of 0.542. Liquidity ratio was positively correlated with BN, GDP and inflation with a correlation coefficient of 0.108, 0.319 and 0.031 respectively. Branch number was positively correlated with GDP and inflation with the coefficient of 0.918 and 0.105 respectively.

The result from the fixed effect model estimation show that selected private commercial banks' profitability has been affected significantly by their ratio of loan loss provision, capital adequacy ratio and the liquidity ratio. Thus, the ratio of loan loss provision (0.0715) and capital adequacy ratios (0.0246) have a statistically negative impact on selected private banks' profitability. On average a 1 percent increase in the ratio of loan loss provision of these banks decreases, their profitability by about 0.715 percentage points. Similarly, a 1 percentage point increase in their capital adequacy ratio decreases selected banks' profitability by about 0.246 percent on average. On the other hand, the liquidity ratio is

found to have a statistically significant positive impact on selected private banks' profitability as explained by their return on assets. Therefore, a 1 percent increase in this ratio, increases selected banks' profitability by about 0.04 percent on average.

The result also show that the ratio of non-performing loan to total loans as well as total loans and advances and inflation, GDP, and number of branch of selected private commercial banks in Ethiopia have no statistically significant impact on return on assets of these banks.

5.2. Recommendations

The following possible recommendations are forwarded by the researcher based on the above conclusion.

- From empirical results loan loss provisions and capital adequacy ratio have negative and significant impact on profitability. The negative sign of loan loss provision shows that increasing of this variable will lead to the decreasing of profitability. This implies that the existence of high loan loss provision inversely affects the profitability of the banks. Thus, the study suggests that private commercial banks should decrease their level of loan loss provision.
- Capital adequacy ratio has a negative and significant impact on the profitability of private commercial banks. Therefore, the private commercial banks should give more attention in handling of capital adequacy ratio. Therefore the study recommends that the private commercial banks should manage their capital adequacy ratio.
- Liquidity ratio has positive and significant impact on profitability of selected commercial banks in Ethiopia. The positive sign of liquidity ratio shows that increasing in this variable will lead to the higher profitability performance. Thus, the study suggests that selected private commercial banks should increase their level of liquidity ratio at optimum level and thereby increase the credit worthiness which enables them to be more liquid in providing loan to their customers.
- Since credit risk management in general has very significant and contributions to bank profitability, the private commercial banks are advised to put more emphasis on credit risk management. In addition to this, in order to reduce risk and achieve maximum profit the private commercials need to give more attention on the management of loan loss provision, capital adequacy ratio and liquidity ratio.

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Appendix I: Descriptive Statistics of the Variables

	ROA	NPL	LPR	LA	CAR	LR	GDP	INFLN	BN
Mean	0.041134	0.519000	0.038251	3.428018	0.067827	1.144833	0.109400	0.180400	56.383
Median	0.041877	0.480000	0.030000	3.456855	0.058840	1.130000	0.113000	0.166500	49.500
Maximum	0.064868	0.990000	0.227498	3.974495	0.141746	1.260000	0.126000	0.364000	152.000
Minimum	0.005131	0.010000	0.010000	0.477247	0.033259	1.040000	0.085000	0.028000	17.000
Std. Dev.	0.009401	0.314765	0.029956	0.461644	0.025592	0.047745	0.011067	0.106259	29.370
Observations	60	60	60	60	60	60	60	60	60

Source : Output of E-view 6

Appendix II: Correlation Analysis

Variable s	ROA	NPL	LPR	LA	CAR	LR	GDP	INFLN	BN
ROA	1.000000								
NPL	-0.242035	1.000000							
LPR	-0.063197	0.069184	1.000000						
LA	0.127049	-0.113604	-0.056876	1.000000					
CAR	-0.041097	-0.101760	-0.110859	-0.148727	1.000000				

LR	0.492620	0.132279	0.067210	0.025909	0.542302	1.000000			
GDP	0.124121	0.102243	0.129174	-0.293481	0.073155	-0.117270	1.000000		
INFLN	-0.027873	-0.083739	-0.037574	0.214337	-0.042639	0.125861	-0.630378	1.000000	
BN	0.306002	0.027904	0.151442	0.553335	-0.237073	0.121310	-0.260101	0.159297	1.000

Source : Output of E-view 6

Appendix III- Heteroskedasticity Test: White

F-statistic	1.372482	Prob. F(8,51)	0.2310
Obs*R-squared	10.62912	Prob. Chi-Square(8)	0.2236
Scaled explained SS	14.62211	Prob. Chi-Square(8)	0.0669

Source : Output of E-view 6

Appendix IV- Multicollineality Test.

Variables	NPL	LPR	LA	CAR	LR	GDP	INFLN	BN
NPL	1.000000							
LPR	-0.069184	1.000000						
LA	-0.113604	-0.056876	1.000000					

CAR	- 0.101760	- 0.110859	- 0.148727	1.000000				
LR	0.132279	0.067210	0.025909	0.542302	1.000000			
GDP	0.102243	0.129174	- 0.293481	0.073155	- 0.117270	1.000000		
INFLN	- 0.083739	- 0.037574	0.214337	- 0.042639	0.125861	- 0.630378	1.000000	
BN	0.027904	0.151442	0.553335	- 0.237073	0.121310	- 0.260101	0.159297	1.000000

Source : Output of E-view 6

Appendix V- Regression Results

Dependent Variable: ROA

Method: Panel Least Squares

Date: 05/23/15 Time: 06:17

Sample: 2004 2014

Periods included: 11

Cross-sections included: 6

Total panel (unbalanced) observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.089118	0.041724	-2.135916	0.0380
NPL	-0.002466	0.003363	0.733060	0.4672
LPR	-0.066771	0.036187	-1.845200	0.0715***
LA	-0.002494	0.002682	-0.930057	0.3572
CAR	-0.133580	0.057494	-2.323350	0.0246**
LR	0.133904	0.035396	3.783056	0.0004*
GDP	0.053949	0.117860	-0.457741	0.6493
INFLN	-0.010236	0.011586	-0.883503	0.3816
BN	6.36005	4.27005	1.491918	0.1425

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.548873	Mean dependent var	0.041134
Adjusted R-squared	0.421381	S.D. dependent var	0.009401
S.E. of regression	0.007151	Akaike info criterion	-6.842085
Sum squared resid	0.002352	Schwarz criterion	-6.353405
Log likelihood	219.2626	Hannan-Quinn criter.	-6.650936
F-statistic	4.305149	Durbin-Watson stat	2.253652
Prob(F-statistic)	0.000111		

Note : *, **, ***: denotes 1% 5% and 10% significant level respectively

Source: output of E-view 6

Appendix V- Summary of Hypothesis and Results

No	Hypothesis	p-value	Discussion
1	There is no significant relationship between non- performing loans and bank's Profitability	0.4672	Accept H0
2	There is no significant relation between loan loss provisioning and profitability.	0.0715	Reject H0
3	There is no significant relationship between loans and advances and bank's Profitability	0.3572	Accept H0
4	: there is no significant relation between Capital adequacy and bank's profitability	0.0246	Reject H0
5	there is no significant relation between liquidity ratio and bank's profitability	0.0004	Reject H0
6	There is no significant relation between numbers of branch and bank profitability	0.6493	Accept H0
7	There is no significant relationship between annual GDP growth rate and banks profitability	0.3816	Accept H0

8	There is no significant relation between Annual inflation rate and profitability.	0.1425	Accept H0

Appendix VII- Ratio Data

YEAR	Bank	ROA	NPL	LPR	LA	CAR	LR	GDP	INFLN	BN
2005	FIRM1	0.0284	0.9400	0.0283	3.3487	0.0339	1.0700	0.1260	0.0610	33.0000
2006	FIRM1	0.0407	0.2200	0.0228	3.5002	0.0339	1.0900	0.1150	0.1060	37.0000
2007	FIRM1	0.0427	0.7100	0.0211	3.6008	0.0333	1.1000	0.1180	0.1580	42.0000
2008	FIRM1	0.0425	0.4500	0.0226	3.6417	0.0333	1.1000	0.1120	0.2530	48.0000
2009	FIRM1	0.0362	0.3900	0.0228	3.6485	0.0580	1.1000	0.0990	0.3640	54.0000
2010	FIRM1	0.0371	0.8900	0.0203	3.7032	0.0537	1.1000	0.1040	0.0280	59.0000
2011	FIRM1	0.0430	0.5000	0.0177	3.7936	0.0475	1.1100	0.1140	0.1810	65.0000
2012	FIRM1	0.0510	0.8800	0.0152	3.9098	0.0464	1.1200	0.0850	0.3430	75.0000
2013	FIRM1	0.0412	0.9400	0.0197	3.9475	0.0391	1.1100	0.1050	0.1350	112.0000
2014	FIRM1	0.0596	0.5000	0.0211	3.9745	0.0364	1.1200	0.1160	0.1750	142.0000
2005	FIRM2	0.0247	0.8900	0.0620	3.1106	0.0586	1.0800	0.1260	0.0610	33.0000
2006	FIRM2	0.0376	0.5200	0.0491	3.2723	0.0531	1.0800	0.1150	0.1060	36.0000
2007	FIRM2	0.0533	0.0600	0.0434	3.4000	0.0421	1.1000	0.1180	0.1580	43.0000

2008	FIRM2	0.0423	0.8000	0.0464	3.4374	0.0427	1.1100	0.1120	0.2530	53.0000
2009	FIRM2	0.0315	0.1600	0.0550	3.4334	0.0509	1.1200	0.0990	0.3640	60.0000
2010	FIRM2	0.0442	0.2800	0.0471	3.4977	0.0478	1.1200	0.1040	0.0280	62.0000
2011	FIRM2	0.0499	0.9700	0.0364	3.6006	0.0498	1.1400	0.1140	0.1810	70.0000
2012	FIRM2	0.0445	0.3700	0.0270	3.7407	0.0561	1.1400	0.0850	0.3430	86.0000
2013	FIRM2	0.0439	0.4100	0.0230	3.8871	0.0564	1.0400	0.1050	0.1350	114.0000
2014	FIRM2	0.0471	0.8000	0.2275	3.9627	0.0524	1.2200	0.1160	0.1750	152.0000
2005	FIRM3	0.0399	0.0100	0.0592	3.0913	0.0859	1.1300	0.1260	0.0610	22.0000
2006	FIRM3	0.0430	0.9000	0.0311	3.2929	0.0790	1.1700	0.1150	0.1060	26.0000
2007	FIRM3	0.0280	0.4400	0.0265	3.3627	0.0849	1.1300	0.1180	0.1580	28.0000
2008	FIRM3	0.0051	0.0400	0.0384	3.4498	0.0712	1.0900	0.1120	0.2530	42.0000
2009	FIRM3	0.0266	0.3700	0.0925	3.4328	0.0649	1.1000	0.0990	0.3640	47.0000
2010	FIRM3	0.0313	0.2500	0.0844	3.4988	0.0523	1.1000	0.1040	0.0280	47.0000
2011	FIRM3	0.0355	0.4800	0.0704	3.5206	0.0455	1.1000	0.1140	0.1810	57.0000
2012	FIRM3	0.0350	0.4700	0.0283	3.5908	0.0412	1.1200	0.0850	0.3430	61.0000
2013	FIRM3	0.0285	0.2600	0.0213	3.6723	0.0538	1.1300	0.1050	0.1350	86.0000
2014	FIRM3	0.0464	0.3000	0.0185	3.7042	0.0534	1.1200	0.1160	0.1750	109.0000
2005	FIRM4	0.0390	0.7400	0.0500	3.0009	0.0636	1.1200	0.1260	0.0610	29.0000
2006	FIRM4	0.0416	0.9100	0.0500	0.4772	0.0498	1.1300	0.1150	0.1060	33.0000
2007	FIRM4	0.0440	0.3500	0.0400	3.3334	0.0590	1.1400	0.1180	0.1580	39.0000
2008	FIRM4	0.0461	0.7500	0.0600	3.3705	0.0433	1.1800	0.1120	0.2530	40.0000
2009	FIRM4	0.0500	0.8900	0.0600	3.3248	0.0536	1.2000	0.0990	0.3640	49.0000
2010	FIRM4	0.0553	0.2000	0.0400	3.3934	0.0688	1.2300	0.1040	0.0280	50.0000
2011	FIRM4	0.0568	0.9700	0.0500	3.4639	0.0802	1.2100	0.1140	0.1810	53.0000
2012	FIRM4	0.0549	0.0100	0.0200	3.5521	0.0693	1.2100	0.0850	0.3430	60.0000

2013	FIRM4	0.0436	0.4800	0.0200	3.6712	0.1072	1.1900	0.1050	0.1350	79.0000
2014	FIRM4	0.0356	0.2000	0.0200	3.6632	0.1055	1.2100	0.1160	0.1750	100.0000
2005	FIRM5	0.0401	0.4000	0.0400	2.7731	0.1417	1.1300	0.1260	0.0610	17.0000
2006	FIRM5	0.0375	0.9500	0.0300	3.0017	0.1047	1.1400	0.1150	0.1060	22.0000
2007	FIRM5	0.0399	0.6800	0.0300	3.1492	0.0713	1.1900	0.1180	0.1580	27.0000
2008	FIRM5	0.0387	0.0900	0.0300	3.2694	0.0962	1.1700	0.1120	0.2530	36.0000
2009	FIRM5	0.0287	0.4800	0.0300	3.3329	0.0866	1.1300	0.0990	0.3640	41.0000
2010	FIRM5	0.0420	0.1200	0.0400	3.4172	0.0674	1.1300	0.1040	0.0280	42.0000
2011	FIRM5	0.0417	0.2600	0.0300	3.5155	0.0562	1.1400	0.1140	0.1810	50.0000
2012	FIRM5	0.0463	0.8500	0.0200	3.6112	0.0619	1.1500	0.0850	0.3430	69.0000
2013	FIRM5	0.0307	0.0300	0.0200	3.6731	0.0609	1.1300	0.1050	0.1350	75.0000
2014	FIRM5	0.0649	0.9900	0.0100	3.6987	0.0574	1.2600	0.1160	0.1750	99.0000
2005	FIRM6	0.0381	0.2700	0.0275	3.0542	0.0832	1.1600	0.1260	0.0610	17.0000
2006	FIRM6	0.0400	0.7200	0.0319	3.1688	0.0720	1.1600	0.1150	0.1060	20.0000
2007	FIRM6	0.0407	0.9700	0.0314	3.2594	0.1013	1.1900	0.1180	0.1580	25.0000
2008	FIRM6	0.0435	0.0600	0.0293	3.3251	0.1132	1.2000	0.1120	0.2530	42.0000
2009	FIRM6	0.0456	0.2300	0.0360	3.3464	0.1154	1.1800	0.0990	0.3640	45.0000
2010	FIRM6	0.0478	0.6600	0.0402	3.4059	0.1045	1.1900	0.1040	0.0280	48.0000
2011	FIRM6	0.0484	0.8700	0.0359	3.4419	0.0997	1.2000	0.1140	0.1810	51.0000
2012	FIRM6	0.0471	0.5400	0.0308	3.5692	0.0984	1.2300	0.0850	0.3430	58.0000
2013	FIRM6	0.0428	0.9700	0.0221	3.6573	0.1132	1.2200	0.1050	0.1350	72.0000
2014	FIRM6	0.0364	0.3000	0.0210	3.7330	0.1067	1.2100	0.1160	0.1750	94.0000