COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ACCOUNTING AND FINANCE

EFFECT OF LOAN PORTFOLIO MANAGEMENT ON FINANCIAL PERFORMANCE OF ETHIOPIAN COMMERCIAL BANKS

A THESIS BY:

Mulushewa Tola (GSE/3714/11)

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTERRS OF BUSINESS ADMINISTRATION SPECIAIZATION IN FINANCE (MBA FINANCE)

ADVISOR

Alem Hagos [PhD]

JANUARY, 2021

ADDIS ABABA, ETHIOPIA

ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ACCOUNTING AND FINANCE

EFFECT OF LOAN PORTFOLIO MANAGEMENT ON FINANCIAL PERFORMANCE OF ETHIOPIAN COMMERCIAL BANKS

A THESIS BY:

MULUSHEWA TOLA

APPROVED BY BOARD OF EXAMINERS

ADVISOR	**SIGNATURE**
_____	_____
EXTERNAL EXAMINER	**SIGNATURE**
_____	_____
INTERNAL EXAMINER	**SIGNATURE**
_____	_____

DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Alem Hagos (PHD). All sources of materials used for the thesis have been duly acknowledged. I further confirm that this research has not been submitted either in part or in full to any other higher learning institutions for the purpose of earning any degree.

Declared by;

Name: Mulushewa Tola

Signature; _____

Date: January 31, 2021 GC

Place: Addis Ababa, Ethiopia

Advisor: Alem Hagos (PHD)

Signature: _____

Date: _____

Addis Ababa University, collage of business and Economics, Addis Ababa January 31, 2021 GC

Acknowledgements

First and foremost, praises and thanks to the Almighty God, for his showers of blessings throughout my research work to complete it successfully.

I would like to express my deepest and sincere gratitude to my thesis advisor, Dr. Alem Hagos (PHD), for providing me invaluable guidance throughout this research. It was great privilege and honor to study under his guidance. My completion of this research couldn't have been accomplished without the support of my friends and my class mates and hence many thanks to them.

Finally, I would like to thank my parents for their love, prayers, caring and sacrifices for educating and preparing me for future.

Abstract

The purpose of the study was to examine the effect of loan portfolio quality on the financial performance of selected commercial banks in Ethiopia. Witha dataset from the annual reports for all the17Ethiopiancommercial banks for 5 years from 2015 to 2019 G.C.Panel data regression and correlation analysis was used to analyze the relationship between dependent variable and independent variables. The regression analysis was facilitated with the aid of EViews9 statistical software. An ordinary Least Square (OLS) method is used as a technique in order to test the parameters of the model assumptions. Return on Equity (ROE) is used to proxy financial performance whiles Loan to asset ratio (LAR), Liquidity (LIQ), loan Loss Provision (LLR), size of total Deposit (LogD), Capital Adequacy ratio (CAR) and Loan Growth (LGR) is used as proxies for loan portfolio management indicator. The result has indicated that Loan Growth has an inverse relationship with profitability while Capital Adequacy ratio and loan Loss Provision have a positive association with profitability of the commercial Banks. The study suggests the National bank to continually respond to the socioeconomic impact banks may have as well as the Banks need to work proactively in developing various product portfolio to meet the demand of their respective customers.

Keywords: ***Loan portfolio, Financial Performance, Panel data, Ordinary Least Square***

Table of Contents

Chapter One

1. Introduction

1.1. Background of the study

As the research title implies, this study was focused on investigations of the effect of Portfolio management on performance of Ethiopian commercial banks. Commercial banks had and still have significant position in every country's economy. The main role of commercial banks is to make the community's surplus of deposits and investments useful by providing it in the form of loan to people for various investment purposes: company growth, education & houses. Those banks are firms that give a wide range of financial functions for profit. Among the different functions, lending function is the core product line of commercial banks which contributes the major share of revenue to their profitability. But their functionality is not without risk. Currently, the main income of the banking system comes from the credit facility availed to customers and hence exposes them to high credit risk which intern lead them to lose significant amount of their income.

As a result, the need to employ a sound Portfolio management system is crucial in order to achieve their objective. Loan portfolio Management holds a positive relationship with credit monitoring, reliability and assurance factors. All these factors play vital role in the mitigation process of risks (Oldfield & Santomero, O. G. (2000). Loan portfolio management can be considered as the heart of any commercial bank efficiency as it plays vital role in the performance of a financial institution by analyzing credit worthability of borrowers. On the other hand, weakloan portfolio management is the main reason behind in Bank's unsatisfactory performance and often the reason of bankruptcy (William Amay . Among the variables that affect their performance negatively, impact of non-performing loans and loan loss provisioning are the major ones. Besides, having adequate amount of capital, having sufficient deposit & liquid asset as well as amount of loans and advances are the ones that affect their performances positively where the study tries to focus on with the exception of the non-performing loans. As far as the researcher knowledge is

concerned, in the problematic areas of the current topic, a number of researchers were done but only limited of them are in Ethiopia.

The major objective of the research was to analyze how commercial banks' financial performance is affected by loan portfolio management considering that there was gap in Ethiopian literature.

Rajan (1994) made an interesting argument that an increase in bank loan growth can be attributed to the myopic concern for banks to increase their reputation but in the short-term. Since a bank may have difficulties recovering losses from questionable loans, it may take an approach to increase short-term profits at the expense of long-term profits by easing credit standards and boosting loan growth. Therefore, banks have a powerful chance of influencing the masses through manipulation of earnings since outsiders will interpret the low profits as a sign of poor management.

Keeton (2009) ascribes banks willingness to lend to euphoria and competition. Most of the times, banks tend to become optimistic in the business expansion process making them underestimate the risk of default on new loans. Based on this perspective, therefore, financial institutions will operate carefully during and after periods of incurring huge losses and later lend at a high interval when the memory of the losses recede. Ideally, banks will compete vigorously during times of prosperity since high profits lead to an increase in new entries. As a result, the competition will lead to a decline in loan rates and credit standards.

Accordingly, the study was started by reviewing related literatures where theoretical review and empirical reviews were the two major parts which was helpful for clarifying the variables that would examine the effect of loan portfolio management in the financial performance of the selected banks.

Hence, the aim of this study was to contribute to the body of research concerned with effect of loan Portfolio management on financial performance of Ethiopian commercial banks.

1.2. Statement of the problem

One of the major roles of banks is to offer loans to borrowers and loans serve as one of the ultimate source of earnings for commercial banks. In other words, loans represent one of the highest yielding assets on banks' balances sheet (Bentum, 2012). The development and establishment of a system for Portfolio management is extremely important from the view point of ensuring the soundness and appropriateness of a financial institution's business. Failure to establish a sound Portfolio management system will results in reduction on financial performance as well as bankruptcy of financial institutions.

Performances of commercial banks can be reflected on profitability where it is an important factor for the smooth running of any business in today's competitive setting and it has a significant impact on the performance of the institutions, as the financial proficiency of banks can also influence the economic development (Tariq, 2014). The main objective of most financial organization is to run profitably in to keep its stability and improve in growth and expansion.

The topic of the research is effect of Portfolio management on profitability of commercial banks in Ethiopia. It was selected because the author considered that there is a gap in literature and existence of time gap while the previous researches were done as well new regulations has been issued by the NBE after the studies were made, which directly impact on the performances of commercial banks. To the author's knowledge , there is no pervious similar study in the area but two studies by Tefera(2011) & Mekasha(2011) were conducted so far on credit risk management where their summary of the research is described below:

Tefera (2011) evaluated the impact of credit risk on the profitability of six private banks and one state bank, Commercial Bank of Ethiopian, taking Return on Equity as measures of bank performance and non-performing loan ratio and capital adequacy ratio as a measure of Portfolio collecting data from their annual reports and analyzed using descriptive, correlation and regression techniques. The findings revealed that credit risk management has a significant impact on the profitability of the commercial banks. Together with the non performing loan&capital adequacy ratio which were used as a credit risk variables.However, this study will test additional control variables including

liquidity ratio, size of deposit and deposit to asset ratio which has an impact on profitability of the commercial banks. Moreover, there are many writers who argue on return on asset is better in order to measure profitability of commercial banks as it is a useful devise for comparing profitability of commercial banks in the same industry.

Mekasha (2011) examined credit risk management and its impact on performances of Private Commercial Banks in Ethiopia considering return on asset as performance measurement and four independent variables(non-performing loans, loan loss provision ratios, Loan Provision to total asset, non-performing loan to total loan & loan provision to non-performing loan) as credit risk measurement. However, capital adequacy and liquidity ratios believed to have a significant impact on profitability of the commercial banks will also include in the current study.

On the other hand, several studies have been done on portfolio management, and how it affects performance, for instance, an investigation whether and how firms in the retail trade sector may benefit by spreading their boundaries within and across regional boundaries (Chang, Timo, & Alan, 2014). They found that intra-regional diversification has a parallel S-curve relationship and interregional diversification has an S-curve connection with firm performance. They further established that unrelated product diversification has an adverse moderating effect on the relationship between inter-regional diversification and firm performance. Overall, these results add support in the services sector for the three-stage paradigm of international diversification and performance.

Kamau (2010) did a survey of adoption of risk management by commercial banks in Kenya. The study revealed that credit, operation, reputation, and compliance risks as critical and commonly encountered. Liquidity risk was a least faced risk. Majority of the banks were found to use both qualitative and quantitative risk measurement methods. These studies have also delved particular risk management variables such as; risk measurements, risk mitigation, risk monitoring, and capital adequacy while ignoring internal control which is very critical in the banking sector. Yijun (2014) as mentioned by Amayo (2018) studied the effect of credit risk administration practices on the profitability

performance of European commercial banks in Europe. The study inferred that there is a connection amongst return on assets (ROA) of banks.

As mentioned by Amayo (2018), Kiplenting (2016)also analyzed the effect of Portfolio Diversification on Commercial Banks Performance in Kenya. They found out that diversification has a significant positive impact on the performance of commercial banks. However, these studies have mainly focused on specific measures of diversification such as product, investment, and channel diversification but have not looked into location diversification and how it impacts on bank performance.

Together with the above evidence in existence of limited literature in our country context and contradiction on the other country study result, the author seeks to uncover how loan portfolio management affects commercial banks financial performance in Ethiopia.

1.3. Guiding research questions:

- To what extent does loan loss provision affect banks financial performance?
- What effect do loans and advances have on banks financial performance?
- How does the amount of capital affect banks financial performance?
- What effect does deposit mobilization of commercial banks has on banks financial performance?
- How do liquid assets of commercial banks affect their financial performance?
- How does loan loss provisioning affect bank's financial performance.

1.4. Objectives of the study

Basing the research problems and research questions, the research intends to achieve the following objectives:

1.4.1. General Objective

The general objective of the study was to analyze the effect of loan portfolio management on the financial performance of Ethiopian commercial banks.

1.4.2. Specific Objectives

This study assumes the following specific objectives:

- To investigate the effect of loans and advances on banks financial performance
- To determine the effect of loan loss provisioning on banks financial performance in Ethiopia.
- To examine the effect of deposit on banks financial performance
- To determine effect banks capital on bank's financial performance.
- To determine to what extent banks liquidity affect financial performance.
- To investigate the effect of loan loss provisioning on bank's financial performance

1.5. Research Hypotheses

As mentioned above, the main objective of this study was to examine the effect of loan portfolio management on the financial performance of Ethiopian commercial banks and based on the preceding sections of research question and objective, the following groups of hypotheses was tested in the authors study.

- ***H1:****Loan to asset ratio (LAR) of Ethiopian commercial banks has positive and significant effect on their financial performance measure (ROA).*
- ***H2:*** *Liquidity to asset ratio (LIQ) of Ethiopian commercial banks has positive and significant effect on their financial performance measure (ROA).*
- ***H3:*** *Loan Loss Provision Ratio (LAR) of Ethiopian commercial banks has negative and significant effect on their financial performance measure (ROA).*
- ***H4:*** *Total Size of Deposit (LogD) of Ethiopian commercial banks has positive and significant effect on their financial performance measure (ROA).*
- ***H5:*** *Capital Adequacy Ratio (CAR) of Ethiopian commercial banks has positive and significant effect on their financial performance measure (ROA).*
- ***H6:*** *Loan Growth (LGR) of Ethiopian commercial banks has positive and significant effect on their financial performance measure (ROA).*

1.6. Significance of the study

Since the study has aimed at revealing effect of loan portfolio management on the performance of Ethiopian commercial banks, it would assist the commercial banks primarily; especially will enable managers on which variables to focus to improve the financial performance of their bank. Moreover, the study will provide evidence whether factors identified by previous studies are the same as the ones found to be influential factors for loan portfolio management of Ethiopian commercial banks. The study may also open the issue of loan portfolio management in banking industry for further and detail investigation for academic scholars as well as for policy makers. Finally, the study as a partial fulfillment, contribute a lot to the knowledge and experience of the researcher.

1.7. Scope of the study

This research was focused on the effect of loan portfolio management on the financial performance of all seventeen commercial banks (Abay Bank S.C (ABB), Addis Bank S.C (ADIB), Awash Bank S.C (AIB), Bank of Abyssinia S.C (BoA), Birhan Bank S.C (BIB), Bunna Bank S.C(BUB), Cooperative Bank of Oromia S.C(CBO), Dashen Bank S.C (DaB), Debub Global Bank S.C (DGB), Enat Bank S.C (EB), Lion Inter'l Bank S.C (LIB), Nib Bank S.C (NIB), Oromia Inter'l Bank S.C (OIB), United Bank S.C (UB), Wegagen Bank S.C (WB), commercial bank of Ethiopia (CBE) and Zemen Bank S.C (ZB). The state owned giant bank, Development Bank of Ethiopia (DBE) where the motive of the bank itself is different from other commercial banks as it focuses on granting loans related to project financing, was not included.

1.8. Organization of the study

In addition to the preliminary part, this paper is organized in four chapters. The first chapter constitutes background information, statement of the problem, objective of the study, research questions, research hypothesis, scope of the study and organization of the study. Chapter two contains review of related literature both theoretical review and empirical evidence. chapter three constitutes research design and methodology. Chapter four contains analyzing and interpretation of descriptive statistics, regression model test and discussion of regression results. Finally, chapter five contains conclusion and recommendation. Reference for the materials cited on this paper work also provided in the final part of this paper.

Chapter Two

2. Literature review

2.1. Theoretical review

2.1.1. Introduction

The core objective of any financial institution, specially commercial banks, is making profit. Its ability to earn return depends on its investment policy. Its investment policy, in turn, depends on the manner in which it manages its investment portfolio. Commercial banks have a wide range of products that constitute their product portfolios. According to the African Development Bank Group (2004), each commercial bank may have its unique collection of products, but there are products that are common to all commercial banks. In other words, all commercial banks have, at least a common sub-portfolio of products. Poudel (2012) revealed that the health of the financial system has important role in the country as its failure can disrupt economic development of the country.

Financial performance is company's ability to generate new resources, from day-to-day operation over a given period of time and it is gauged by net income and cash from operation.Investment is putting money into something with the expectation of gain that upon thorough analysis has a high degree of security for the principal amount, as well as security of return, within an expected period of time (Mortenson, 2010). In addition, Rose (2003) defines investment as the acquisition of capital goods such as buildings and equipment, and the purchase of inventories of raw materials and goods for sale.

Effective credit risk management is the process of managing an institution's activities which create the loan Portfolio exposures, in the way that significantly downgrades the likelihood activities will affect inversely the bank's earnings and capital (NBE, 2010, P.1). the loan portfolio has been a crucial risk in the banking sector as revealed by global experiences. In addition, the main factor for the collapse of most banks in the world is failure to gather loans that has been granted to customers. Banks need to manage their loan Portfolio existing in their overall portfolio as well as the risk in individual credits or transactions. moreover, every banks should be aware that loan Portfolio management does not exist in isolation from other risks, but is closely intertwined with those risks.

2.1.2. Theories of Bank Portfolio Behavior

Many studies have dealt with portfolio behavior in the banking literature; such as the traditional approach, the precautionary approach and the portfolio theoretical approach. (Robinson, 1962) started the analysis of the traditional bank behavior approach. She conducted a study on the conflicting problem between banks' profitability and safety. In addition, she argued that this conflicting problem should be resolved before going through investment of banks funds, and she listed the legal reserve requirements (imposed by Central Banks), safe investment, and advances to customers and investment in the open market for income generation as steps to be taken sequentially. The Central Bank imposes reserve requirement as a legal requirement for banks to permit customers to withdraw deposits upon demand, so this policy should be followed by banks.

A bank is holding of cash for all possible contingencies and, for investment protection such dual-use is considered as the second priority (Hester and Pierce, 1975). By fulfilling its obligation, legal requirement of reserve, protective investment, making loans to customers, then the available funds can be invested on the open market to generate income. Therefore, the first priority in the above framework is safety and interest rates do not influence the choice of the bank's portfolio. In addition, this framework does not specify how a bank optimizes, and hence when portfolio composition is adjusted, due to the absence of marginal analysis which, in turn, comes from the exclusion of interest rates from influencing the choice variables.

Orr and Mellon (1961) and Porter (1961) applied a new approach of bank portfolio behavior. This theory is based on two basic assumptions: the bank minimizes expected loss or maximizes expected return, and the bank is subject to random flows of deposits and estimates the probability distribution of deposits flows. Choosing the optimal beginning-of-period allocation of the funds to maximize expected profits among reserves and other assets is one of the bank's problems. The precautionary model is based on many factors, one of which is uncertainty which plays an important factor but banks are nevertheless viewed as risk neutral. (Hicks, 1935) propose the theory of bank behavior under risk aversion upon which most of the empirical work is based, considered as a popular portfolio theory. He was the first to introduce the idea of mean-variance (μ, $\sigma 2$)

in his paper, which was further developed by Markowitz (1952, 1959). This pioneering study of efficient portfolio selection, along with Tobin's (1958) paper on liquidity preference, all makes explicit the assumptions of risk aversion.

Banks are considered as microeconomic firms that maximize an objective function operating within the framework of balance sheet constraints, authoritative control and market constraints. Banks are supposed to achieve certain goals such as satisfying the depositors, attracting borrowers, maximizing their wealth and fulfilling their commitments to the Central Bank. Studies on the portfolio behavior of commercial banks were started by Edgeworth (1888), who pointed out the importance of random and unsystematic deposit flows that create uncertainty for shaping a bank's optimal portfolio. Both Ply (1971) and Parkin et al., (1970) did not pay attention to the liquidity problem in their models that could arise due to randomness of cash requirements and default risks.

To incorporate the issue of deposit variation, Kane and Malikiel (1965) have tackled it by modification of the Tobin and Markowitz portfolio model. They suggest that the variation of deposits is based on the customers' relationship, as when the relationship is good it will decrease and increase when it is bad. In turn, (Sealey, 1980) accommodates random deposits supply as one of the uncertainties for a bank via an implicit supply function included random deposit supply in his model.

Risk aversion can arise either because the bank's objective function is concave in returns, or because influential depositors, whose deposits are the major source of the bank's funds, or banking authorities, induce it to act as a risk averter are examples of explicit allowance the Portfolio-theoretical approach provides. It can support diversification and handle constraints (Freund, 1956). Moreover, the portfolio theoretical approach places great emphasis on the importance of uncertainty over future rates of return, future deposits withdrawals uncertainty and, therefore over future liquidation costs.

2.1.3. Modern investment portfolio theory

Harry Markowitz published a paper on Modern Portfolio Theory in 1952. Markowitz proved that age-old adage "Don't put all your eggs in one basket" is true. Before the paper was issued, people had an intuitive sense that they should not put too much of their

total wealth in a single investment or type of asset. Markowitz was therefore the first person to prove mathematically, that it was a question of how many eggs to put into which basket.

Hudson-Wilson (1990), states, that the more advanced our thinking can become about the characteristics of each real estate investment and how it resembles and differs from others, the better the return we will be able to achieve. Portfolio theory assumes an investor is both rational and risk averse and as such has a number of choices of investments to construct a portfolio. All investment opportunities involve risk and reward, an efficient frontier can be constructed where combinations of investments will have a given level of risk and return and at the efficient frontier will be the best possible risk reward combination.

Markowitz (1952, 1959) showed that assets in a portfolio can be combined to provide an "efficient" portfolio that will give the highest possible level of portfolio return for any level of portfolio risk as measured by the variance or standard deviation; these portfolios are thus connected to generate the "efficient frontier". Portfolios which have a combination below this efficient frontier will not be maximizing the efficient trade-off, according to the investor's preferences. Having established an efficient frontier it is now necessary to decide where along the frontier the investor will choose a portfolio.

2.1.4. Relationship between Portfolio Management & Banks Performances

Banks are relevant to economic development through the financial services they provide. Their intermediation role can be said to be a catalyst for economic growth. 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; activities like trading, investment and banking, however, it exposes them to Portfolio.

Portfolio plays an important role on banks' profitability since a large chunk of banks' revenue accrues from loans from which interest is derived (Funso et al., 2012). This implies that Portfolio management (loan performance) and bank performance (return on asset) has a significant relationship. Good portfolio management results in good asset

quality of the bank which in return resulted in better bank performance. Thus, it is key importance that banks should practice cautious Portfolio management and protecting the assets of the banks and safe guarding the investors' o interests. Banking institutions are some of the predominant financial institutions whose changes in performance and structure have far reaching implications on the whole economy (Wangi, 2012).

Therefore the instability in financial performance especially in banking industry emanates from the poor Portfolio management. With this notion, Portfolio and profitability of commercial banks are highly interrelated and controlling the exposure of Portfolio to a maximum extent increases the performances of the banks having a better profit.

2.1.5. Profitability of commercial banks

Financial sector plays a pivotal role in bringing sustainable economic growth & development (Javaid, 2011). In order to do so, banking system must be profitable as it is the most significant and consistent indicator for the smooth running of any business in today's competitive setting and has a significance impact on performance positively (Tariq, 2014). Hence, most commercial banks profitability is determined by their ability to maintain capital, captivate loan losses, sustainable future growth of assets as well as providing high return to investors.

The competitiveness and measurement of management's quality can also be indicated through the profitability of banks. Hence, profitability is a pro-foundation for product innovation, diversification and efficiency of the commercial banks. profitability level can highly affects strength of commercial banks as whole in the economy due to the reason that it has the power to absorb risks and tremors that commercial banks can face. The banks ability to hold risks and/or increase their capital is best indicated by Profitability.

2.1.6. Determinants of bank profitability

In banking, the determinants of profitability are well observed and explored as it is increasingly important to strengthen the foundations of domestic financial system as a way to buildup flexibility for capital flow volatility. The determinants on commercial bank profitability have been studied by different authors where they classify them in two major factors:-

- **Internal Factors**: Those factors are internal to the firm where they are related to managerial decisions and policy objectives to be achieved by the management. Internal factors are also called Micro or bank specific determinants. They are under the control of the management and hence called managerial factors. Among the internal factors Capital Adequacy Ratio, credit risk, Productivity growth & bank Performance are the main ones (Almumani, 2013) & (Frederic, 2014). Lartey et al.(2013) has also classified the internal determinants of profitability in two main classes: financial statement determinant and non-financial statement determinants. bank loan composition, expense controlling , different products of bank deposits, bank financial efficiency, capital changes and liquidity management are **financial statement determinant** and **non-financial statement determinant constitutes** number of bank branches, size of the bank and its location.

- **External Factors**: factors which management cannot able to control are external factors and hence they are more of environmental. They are affected by industry related macroeconomic variables like GDP, financial market structure, trade interdependence, Economic growth, inflation and market interest rate and ownership structure (Li & Zou,2014), (Almumani,2013), (Frederic,2014), (Ani et al., 2012) & (Lartey et al.,2013).

In addition to the above indications, Belete (2013) while he was examining the asset liability management and commercial banks profitability in Ethiopia, he states that the internal factors incorporates asset liability management culture of the bank and legal and economic and environmental factors that hinder the smooth operation and performance of the bank are considered as external determinants. With this he stated that asset liability management plays a dynamic role with regard to microeconomic determinants of commercial banks profitability.

2.2. The effect of portfolio management on financial performance

2.2.1. Indicators of financial performance of commercial banks

Performance is said to be the ability to accomplish specific tasks. This is measured against the criteria of accuracy, speed, costs, and levels of completeness (Lebas, 2015).

Organizational performance measurement can be defined as an analysis of an organization's actual performance as compared to the preset goals and objectives (Moulin, 2012). Organizational performance is determined by a myriad of constructs for example, competitiveness, profitability, resource utilization, and quality of service among others. In the financial sector, performance is influenced by a plethora strategic management practices namely portfolio optimization, innovation, total management quality and competitive strategies among others. For the purpose of this study, portfolio management has been critically examined.

As an indicator of commercial banks profitability measurement, many writers focus on ROA & ROE as major indicators of profitability of commercial banks and hence they are described below:-

I. Return on Equity (ROE)

The ROE is an important indicator of how efficiently bank capital is used. Its level is a subject of interest of shareholders, since it expresses the rate of return on the capital invested by them.

ROE directly reflects corporate competitiveness strength and sustainable growth. It is an important indicator in the attractiveness of the equity in the eyes of investors. It's a basic test of how effectively a company's management uses investors' money. It also shows whether management is growing the company's value at an acceptable rate. ROE measures the amount of net income after taxes earned for each dollar of equity capital contributed by shareholders. ROE can be calculated by:-

ROE = profit after tax / own capital

In order to identify the problem, it can be decomposed into the following parts:-

ROE= Net income/total asset * Total asset/Total equity capital = ROA* EM

Where, EM is equity multiplier (measure of leverage).... (Li & Zou, 2014).

EM measures the dollar value of assets funded with each dollar of equity capital. The higher EM ratio indicates the more leverage (or debt) that is used by banks to fund its

assets. High EM ratio and ROA ratio have positive influence on ROE ratios. However, the source of high ROE needs to be concerned by the bank's manager. For example, increasing EM generates increasing ROE ratio while the leverage of bank has also enhanced, which causes solvency risk. But as measure of financial performance, ROE is prone to three problems: a timing problem, a risk problem, and a value problem. These problems mean that ROE is seldom an unambiguous measure of performance. ROE remains a useful and important indicator, but it must be interpreted in light of its limitations and no analyst should mechanistically infer that a higher ROE is always better than a lower one (Lesakova, 2007).

II. Return on asset (ROA)

As per Charles & Kenneth (2013) states that ROA is one of the measures of financial performances of commercial banks. Return on Asset effectively reflects corporate profitability which can be used to evaluate the performance of management in the utilization of the assets.

This intend to measure bank efficiency using its asset. It measures how efficiently management is using its total assets (as reported on the balance sheet) to generate profits (as measured by net income on the income statement). It helps investors measure how management is using its assets or resources to generate more income. It is calculated by dividing Net profit to total assets (Kabajeh, 2012),(Mustafa et al., 2012)**.** When the ratio is higher, it is showing that the management is efficiently utilizing assets indicating how many dollars of earnings the bank derive from each dollar of assets they control.

ROA is useful device for comparing the organizations with in the same industry. The higher ratio indicates the institution is performing well. It is a useful tool for comparing profitability of one bank with other or the whole commercial banking system (Bentum, 2012). It also is used to assess how efficiently a bank is managing its revenues and expenses, and also reflects the ability of the management of the bank to generate profits by using the available financial and real assets (Obamuyi, 2013).

Portfolio optimization is the process of choosing the proportions of various assets to be held in a portfolio, in such a way that the portfolio performs better than any other

according to some criterion (Singh, Sahu & Bharadwaj, 2014). The determination of weights of securities in a portfolio need to be guided by an objective which exploits each stock's characteristics efficiently, for example maximize return for a given risk. Often portfolio optimization is done subject to constraints such as short sale restrictions, transaction costs, liquidity constraints and turnover constraints (Jorion, 2012), which may be regulatory constraints, the lack of a liquid market, or any of many others. Portfolio optimization seeks to maintain desired portfolio risk, return or both by varying each asset's weight in a systematic manner (Rasmussen, 2013). Nature of optimization differs with the desired outcome, either maximization of returns or minimization of risk or both while maintaining portfolio efficiency: the maximum attainable return for a given level of volatility, or alternatively, the minimum attainable volatility for a given level of return (Rasmussen, 2013).

Portfolio optimization is a process that involves two stages; first, observation and experience leading to belief of future performance and, secondly the future performance belief leading to the choice of a portfolio. Portfolio choice therefore involves processing of information. Diversification eliminates some, but not all, of the risk associated with a risky investment. The reason being unsystematic risks, which are unique to individual assets, tend to reduce in a large portfolio, but systematic risks which affect all of the assets in a portfolio to some extent, do not (Ross, Westerfield & Jordan, 2012). Due to free elimination nature of the unsystematic risk through diversification, the systematic risk principle states that the reward for bearing risk depends only on the level of systematic risk. On average, a diversified portfolio will have the same expected return (but less risk/volatility) as a less diversified portfolio with similar characteristics (Ross, Westerfield & Jordan, 2012). The rationale behind this technique contends that a portfolio of different kinds of investments will, on average, yield higher returns and pose a lower risk than any individual investment found within the portfolio.

Diversification strives to smooth out unsystematic risk events in a portfolio so that the positive performance of some investments will neutralize the negative performance of others. Therefore, the benefits of diversification will hold only if the securities in the portfolio are less than perfectly correlated (Van Horne, 2012). Tobin (2016) in

introducing a risk free asset accentuated the nature of relationship to be exhibited by the returns of assets in a portfolio.

Portfolio optimization problem is a well-known problem in the finance world. It involves choosing an optimal set of assets in order to minimize the risk and or maximize the returns of the investment. The investor's objective is to get the maximum possible return on an investment with the minimum possible risk. This objective is achieved through asset diversification (Singh, Sahu & Bharadwaj, 2010) which involves asset allocation.

2.2.2. Effect of asset allocation on financial performance

To increase wealth and meet obligations, portfolio managers need to create a portfolio that will fulfill their needs. The creation of an optimal portfolio includes asset allocation, which is the selection of different primary asset classes (Sharpe, 2012) such as bonds and stocks. The essential part of asset allocation is to optimize the trade-off between risk and return of the portfolio (Bodie et al., 2011). Portfolio managers do not only invest the received deposits to meet future obligations but also to make a profit. Accordingly, portfolio managers are hoping that the total deposits plus the amount of money made through investments exceed the full cash withdrawals (Lloyds, 2015).

Brinson et.al (2016) showed that the asset allocation decision is by far the most dominant factor of portfolio performance as it explains more than 91% of the variation in asset returns. The lack of experience of investment and managing risk lead to poor portfolio decisions. Indeed, investing in emerging economies is more risky than investing in more developed countries. Capital markets can be fragile, lacking both liquidity and transparency. Asset allocation, as well as the performance of different sectors, has received attention from scholars (Ibbotson, 2010; Ibbotson & Kaplan, 2010; Sharpe, 2012; Brinson et al., 2013).

Nevertheless, the result has not been the only difference among researchers. Early studies by Brinson et al. (2016) divided asset allocation into two different elements; asset allocation policy and active asset allocation. Other researchers such as Blake (2013) have used the terminology of strategic and tactical asset allocation. What is important to notice

when examining past research is to determine whether tactical asset allocation has included both market timing and security selection?

2.2.3. Effect of Diversification on financial performance

Diversification as a way of managing portfolio whereby an investor diminishes instability and risks of her/his set of the portfolio through holding a range of unlike investments are lowly correlated with one another (Derek, 2015). Cernas (2011) also defines diversification as a strategy of managing the portfolio through bringing together diverse assets to lower the general risk associated with the investment portfolio. On the other hand, asset diversification is a group strategy joining along more than one asset to reduce the whole investment portfolio risk (Dimitriou, 2012). It is the practice of dividing a portfolio into important asset class of equities, cash equivalents, fixed income, and alternatives. Asset diversification is the share of a portfolio spread through various types of assets, regions, and markets.

Asset diversification is a fundamental principle of sound investing (Dimitriou, 2012). Asset diversification aims to realize revenues for allowed risk margin by a combination of different classes of an asset in a way that is well calculated. This allows the smoothening of the variability in returns achieved in each asset class. According to Perez (2015), bank assets include loans, financial assets, cash, other assets, and premises. Perez (2015) concludes that asset diversification within banks can be measured through examining loans, financial assets; other investments made and cash equivalents. Asset diversification has been adopted widely a strategy aimed at mitigating the turbulent markets and operational environments for investors.

The primary benefit associated with this move is lowering the portfolio volatility and losses and is very crucial especially when there is increased uncertainty (Dimitriou, 2012). The significant advantage of any portfolio diversification is that it diversifies various investments along diverse categories of financial tools, whereby each has its magnitude of risk-return. This diversification type is done with the principal objective being lowering the expected risk that may arise from having all resources put in one investment type only (Syriopoulos, 2015). Through a careful strategy of diversification,

commercial banks may prosper, rather than falling victim to the consolidation trend in the industry.

Bank managers responsible for funds accept diversification to a level that is worthwhile and sensible for the served client and customers gave its risk preferences and come up with a list of intended holdings consequently (Shambe, 2013). Firms desire investments that provide high returns at little risk. Unfortunately, in the real world, mixed returns and risks are bound. Diversification is appreciated as one of the robust and most promising methodologies of lowering chances that anyone poorly performing a class of assets or individual asset would ruin your overall return.

2.2.4. Effect of risk management on financial performance

The understanding of risk is the fundamental step involved in the management of risk. There is a need to identify the various alternatives available in a problem situation. A thorough exploration of all the other options would ease the process of decision making (Hussain & Al-Ajmi, 2012).There must be a common understanding across the bank about the components of risk involved in banking. The responsibility of each of the employees in the bank should be made clear to all. There is also need to set out the accountability of risk management. ‘Who is responsible for what' is to be spelt out in the bank and it should be recorded. If this is missing, then it will be ‘blame game' during the crisis. Understanding the accountability and responsibility is a must for the risk management.

There must be a growing awareness among the employees that risk management influences the business performance. The employees should be eager to understand the most sophisticated tools and techniques of risk management. Application of risk management techniques to various problem situations must also be made known to the employees. Continuous review an evaluation is an essential component of the risk management. Employees must also be aware of the fact that risk management reduces cost or unexpected losses. Risk management strategy has to be set by the bank, and there should be a team to monitor the same. All these issues constitute the efficient risk management (Cebenoyan & Strahan, 2014).

The risk identification has a role to play in the success of risk management. Unless the risk management team has the required competencies to identify the possible risks the bank cannot anticipate the danger in advance and prepare itself to face the challenges it may cause. The bank's roles and responsibilities must have a provision for risk identification when things could go wrong (Hassan, 2009). Knowledge about the strengths and weaknesses of other banks is also essential for the risk identification of a bank. So a systematic procedure for risk identification for the risk will have to be developed by a bank, and it differs from bank to bank.

There must be an assessment regarding the likelihood of risk (Hussain & Al-Ajmi, 2012). There are several quantitative techniques which are available to assess the risk. A team must be constituted to study those quantitative methods and pick the relevant. Qualitative methods of risk assessment should also be used such as those who classify risk to be low, medium and high qualitatively. Cost-benefit analysis plays a vital role in risk management. Active management is required for analyzing risk includes identifying, prioritizing of risk and selection. A resource constraint on risk treatment implementation is the bank's response to analyzing risk which provides for identifying, prioritizing risk treatment Oldfield & Santomero (2000).

The risk monitoring must be an integral part of routine management reporting. The level of control by the bank must be appropriate for the risk that it faces. There must be a sufficient reporting and communication processes within the bank to handle risk. The bank's response to risk must also include action plans in implementation decisions about identified risk. A team has to be constituted by the bank to monitor the risk on a timely basis continually. Quantitative methods need to be employed to control the deviation from the normal mode of operation (Tai, 2014).

2.3. Empirical evidence

A number of researches have examined the effect of loan portfolio management on the performance of banks in a number of countries. The results varied from one research to another as follows:-

Khalid (2012) examined the impact of asset quality on profitability of private banks in India, of which a multiple regression model was hired to examine if bank asset quality and functioning performance are positively connected. The outcomes presented that a bad asset ratio is negatively associated with banking operating performance, after controlling for the effects of operating scale, traditional banking business concentration and the idle fund ratio. The outcomes more reinforced the hypothesis that the higher the quality of the loan processing activities before loan approval, the lower the non-value-added activities that is required to process problematic loans, and thus the higher the banking operating performance will be.

Opoku et.al, (2014) assessed the relative performance of products that make up the product portfolio of commercial banks in Ghana. The researchers were used secondary data on 20 commercial banks in Ghana which span a period of five years (2009-2013). The Analysis of Variance and ordinary least squares regression analysis were used to test hypotheses. The study found that, lending as a product contributes the highest revenue to financial return among commercial banks, followed by investment. Deposits and consultancy come with the lowest contributions to financial returns. Also, all products significantly predict financial performance in terms of return on investment at 5% significance level, with lending contributing the highest variance of 87.6%, followed by investment products (63.2%) furthermore the study also found that, deposits and consultancy also significantly influence financial performance in the commercial banks.

Eric Nkuah, (2015), examined the effect of loan portfolio quality on the performance of banks using dataset from the annual reports for 10 Ghanaian universal banks from 2007 to 2013. The study employed panel regression technique with the aid of STATA Statistical Software.The researcher used Return on Equity and Net Interest Margin as proxy to financial performance whiles Loan Portfolio Profitability and Loan Loss Provision to Gross Loan Advances as proxies for loan portfolio quality. Cost Income Ratio, Liquid Funds to Total Assets and Total Assets were also used as control variables. The result indicates that LLP/GLA has a negative and net interest margin has a positive effect on the financial performance of the selected banks. The result further recognized that firm size

has positive and cost-to-income ratio has a negative significant effect on the performance of worldwide banks in Ghana.

Paul Kiama Thiong'o (2017) evaluated the consequence of loan portfolio growth on financial performance of commercial banks in Kenya for five-year period from 2011 to 2015". The study was used a regression research design to evaluate the effect of growth in loan portfolio on financial performance basing sample of 31 commercial banks in Kenya. The study was used primary data, questionnaire, and secondary data and data was analyzed using descriptive statistics and summarized in frequency tables. The study found that growth in loan portfolio had a significant negative effect on financial performance of commercial banks in Kenya. This thesis found that the quality of banks assets had a optimistic effect on economic presentation of commercial banks in Kenya. The effect of asset quality was found to be statistically significant. Also the study initiate that liquidity management had negative insignificant effect and wealth adequacy had a positive significant effect on financial presentation of commercial banks in Kenya.

Alhassan et al (2013) examined the persistence of bank asset quality on bank advancing behavior in Ghana. The study hired a random effects (RE) model to check the relationship between bank lending behaviorperoxide as the ratio loans and advances to total asset and bank asset quality (ratio of nonperforming loans to gross loans and advances) while controlling for deposit mobilization, equity, management efficiency, intermediation spread and income diversification. The empirical estimation found that the effect of the deterioration of bank asset quality (high levels of non-performing loans) on bank lending behavior is persistence and not contemporaneous. Additionally, bank deposit mobilization, intermediation spread and equity were also found to influence bank lending behavior.

Alhassan et al (2014) investigated the factors that account for the deterioration in the asset quality of Ghanaian banks during a period of financial crises using a dataset on 25 banks from 2005 to 2010. The study found that the persistence of non-performing loans in addition to loan growth, bank market structure, bank size, inflation, real exchange rate and GDP growth are the significant determinants of banks asset quality in Ghana. The

study further revealed the findings have implications for both bank management and regulators in emerging economies.

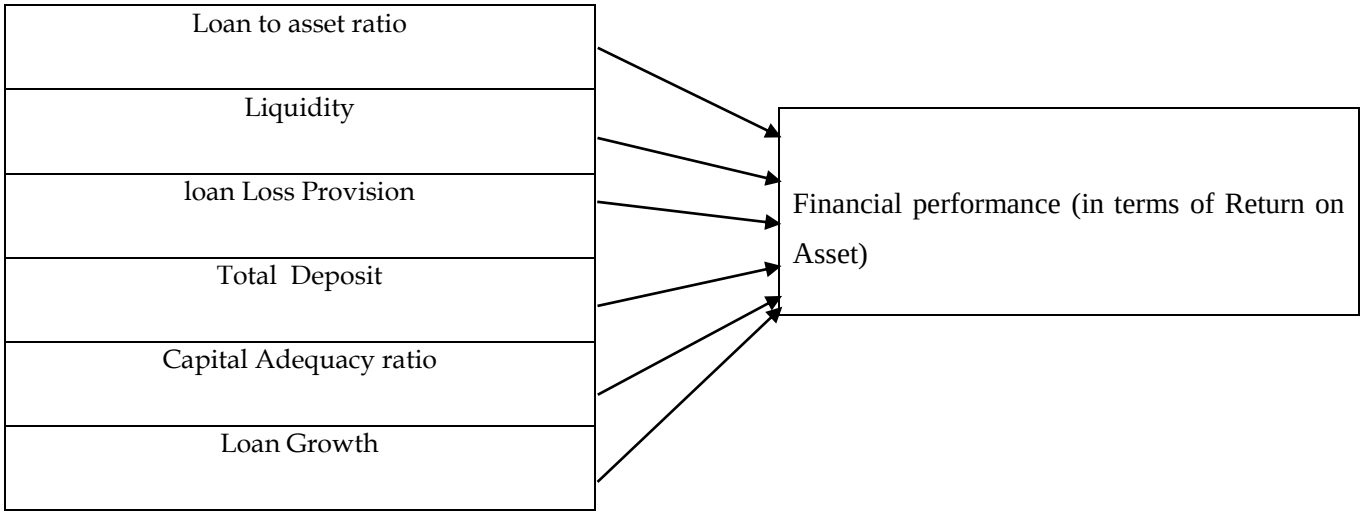
George et al (2013) carried out a study on the analysis of the loan portfolio management on organization profitability: a case of commercial banks in Kenya using a descriptive survey. Their analysis was based on variables such as the profitability measures, interest expense, administrative cost, and asset value at the organizational level. They picked a sample at the management level. Using regression analysis, they found out that, the loan portfolio has a direct influence on the profitability of the banks whereas non-performing loans and the new loans have different impact on the profitability of the bank. They further asserted that, the interest expense was rated highly as a factor that works to reduce the profits. They also pointed out that, the administration costs especially salary and overheads were utterly blamed on reducing profitability. Their findings further revealed that, the depreciation of assets and the provisions was seen as a dent to profitability of any bank. However, it was also noted that the size of bank by asset value does not per se translate to higher profitability but it is a key fact for profitability efficiency.

Swamy (2015) examined the factors of bank asset value and profitability by panel data techniques and robust data sets for the period between 1997 and 2009. The study established that while investment activity and capital adequacy significantly affect the profitability of commercial banks, separately from further accepted determinants of profitability, asset size has no significant impact on profitability.

In outlook of this hole in the academic literature of the subject, this study examined the effect loan portfolio management on financial presentation of commercial banks in Ethiopia. This was done by evaluating the relative effect of each product on the return of investment of commercial banks. It also provides empirical evidences that help commercial banks to prioritize investment in their products.

2.4 Conceptual framework

The main objective the study was to examine the effect loan portfolio management on financial performance of commercial banks in Ethiopia. Accordingly, based on the theoretical review and empirical result discussed in the literature, the following conceptual frame work has been developed.



Chapter Three

3. Research Design and Methodology

The methodology part of the research explains the design of the research, instruments to beutilized in order to answer the research questions, the sources of data, sample specification and finally the model adopted explaining the dependent as well asindependent variables.

3.1. Research design

A research design is a master plan that stipulates the methods and procedures for collecting and analyzing the needed information. It provides a framework or plan of action for the research (Zikmund, 2003). The design of the research was quantitative as the author focused on numeric data obtained from financial statements of the selected banks and then regression analysis was run. The purpose of the research paper was explanatory as the emphasis in explanatory research is on studying a condition or a difficult in order to clarify the relationships between variables. It also attempts to build and elaborate on theories and add to predictions and principles where possible.

Therefore, the cause and effect association between dependent (financial performance) andIndependent variables (loan portfolio management) were studied. Panel data regression analysis was used to examine the extent to which loan Portfolio management affect economic presentation of commercial banks in Ethiopia within the period 2015 to 2019. Paneldata is a dataset in which the behavior of entities like states, companies, individuals and countries are observed across time. The estimation technique is adopted because it takes care of heterogeneity associated with individual banks by permitting for separate specific variables; it gives more informative data, more variability, less collinearity among variables, more degree offreedom and more efficiency (Charless & Kenneth, 2013). It also in reaches empirical analysis insuch a way that may not be possible if either only time series data or cross sectional data is used.

As said by Samy(2003) quoted by Abiola & Olausi(2014), Panel data analysis was normallyinvolved two main models; Fixed effect and Random effect.Fixed effect model was used when to control omitted variables that vary among the cases but are constant

over time. This model helps to track differences in the variables over time to guess the effect of independent variables on dependents variables. The key method used for analysis of panel data is fixed effect. Statistically, fixed effect is always a sensible thing to do with panel data because they give reliable result but may not be the most efficient model to run. The unintentional consequence is used where some omitted variables may be constant over time but vary between cases, others may be fixed between cases but vary over time (Abiola & Olausi,2014).

3.2. Population of the study

Statistics used for the study were collected from all seventeen commercial banks in Ethiopia. The names of the commercial banks included in were: Abay Bank share company (ABB), Addis International Bank share company (AdIB), Awash Bank share company (AIB), Bank of Abyssinia share company (BOA), Birhan International Bank share company (BrIB), Bunna International Bank share company (BIB), Cooperative Bank of Oromia Share Company (CBO), Dashen Bank Share Company (DAB), Debub Global Bank share company (DGB), Enat Bank share company (EB), Lion international Bank Share Company (LIB) , Nib International Bank Share Company (LIB), Oromia International Bank Share Company (OIB) United Bank share company (UB), Wegagen Bank share company (WGB), & Zemen Bank (ZB). and Commercial Bank of Ethiopia(CBE).

The national possessed bank, Development Bank of Ethiopia (DBE) where the purpose of the bank itself is different from other commercial banks as it specialized bank to financemedium and long-term investment projects that are in the government's priority sectors is not included.

Five years examined financial statement data ranging from 2015 to 2019 G.C (Gregorian calendar) were collected from each banks as well as NBE where the data were used as independent variables as well as dependent variable in the regression model. Theoretically, thenumber of observations should be 20:1 (20 observations per one independent variable) in theregression analysis and as low as 5:1(Hosna et al., 2009). Accordingly, 85 observations per six(6) independent variables are between the maximum and minimum standards and hence satisfactory with respect to the cut of points.

The investigator lead a census method, where all commercial banks under the study period is covered, thus was fairly represent the commercial banks sector of Ethiopia. Meanwhile through the population census, 85 observations was collected from all 17 commercial banks for 5 consecutive years (2015-2019 G.C).

3.3. Sources and instruments of data collection

The study showed on data got from secondary sources.The secondary data 5 years audited business reports from all +commercial banks ranging from2015- 2019 G.C taking from National Banks of Ethiopia as well as from the respective banks. Composed with the financial report; credit policy and procedure manuals, Brochures, National Bank of Ethiopia Directives as well as reference materials that are did by previous researchers in the topic area were also used.

3.4. Data analysis and interpretation

Panel data regression and correlation analysis was used to analyze the relationship between dependent variable and independent variables. The regression analysis was facilitated with the aid of EViews 9 statistical software. Ordinary Least Square (OLS) methods was used as a technique in order to test the parameters of the model assumptions. 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" (Moore et al., 2009, p.120) citedby (Li & Zou, 2014).

3.5. Model specification

The author has hired Charles & Kenneth (2013) econometric model which were used as a model while they were researching 'impact of credit risk management and capital adequacy on the profitability of commercial banks in Nigeria' with little modification. As is specified under the restriction part of introductory section, NPL of the selected commercial banks, except that of AIB S.C, were private and hence they did not disclose in their annual financial reports so the non-performing loan to total loan ratio included by the authors' were replaced by loan loss provisioning which is a good Portfolio indicator by showing the quality of loan.

The general equation of multivariate regression model is:

$$Yi = \beta o + \beta 1X1i + \beta 2X2i + \beta 3X3i \cdots + \beta kXki + \epsilon i$$

Where:

i goes from 1 to N, N is the number of observation

Bo is the intercept

B1-Bk is the slope of the line

Xi- is the independent variables

Yi- is the dependent variable

Accordingly, the model adopted for the current study was specified as below:-

ROA= Bo + B1 LLP/LA + B2 LQA/TA + B3 C/TA + B4 LA/TA + B5 LA **+ B6LOG D +** μ

Where:

ROA- Return on Asset (dependent variable)

LLP-Loan Loss Provision

LA- Loan & Advances

LQA-Liquid Asset

TD-Total Deposit

CAR – Capital adequacy ratio

TA-Total Assets

LOGD- the natural logarithm of deposit (size of deposit)

LGR-Loan growth ratio

C= capital

Bo- the constant term (intercept),

B1-B6 is coefficient of independent variables and

μ -is the error term.

The model in the above equation can be rewritten as:

$$ROA = \beta_0 + \beta_1 LLPR + \beta_2 LTA + \beta_3 CAR + \beta_4 LAR + \beta_5 LGR + \beta_6 LOGD + \mu$$

Where: LLPR= LLP/LA, LAT= LQA/TA, CAR= C/TA, LAR= LA/TA,

LGR= %ΔLG and LOG D = the natural logarithm of total deposit.

3.6. Definition of dependent and independent variables

3.6.1. Introduction

(Kebajeh, 2012) as cited by Andegzer (2015), profitability ratios are an cane for the firm's overall competence, growth, success & control and hence frequently used as a measure for earning capacity of company based on its level of sales, assets, capital employed, net worth and earnings per share So, Creditors and Stockholders are interested in profitability ratios since they show the company's capability to meet interest obligations & the progress and the rate of return on their investments respectively. Investigators have certain on ratios as the suitable ways to measure profitability and hereafter banks are reporting in their annual reports in the form of ratios because the use of profitability ratios are not influenced by changes in price levels as one make use of time series analysis and at the same time. Therefore it was for such a reason that the author was used ratio for the dependable variable as well as independent variables to be described below.

3.6.2. Dependent Variable

ROA: Measure of financial performance of the commercial banks

ROA is used as a chief metric for measuring profitability while theendogenous drivers of bank profitability were used as the independent variables (Ani etal., 2012). Almumani (2013) discovered that a profitable banking sector is better able to with stand negative shocks and contribute to the stability of the financial system and hence financial institutions must watch prudently the determinants of profitability as they are increasingly vital in order to strengthen the foundations of domestic financial system as a way to build flexibility for cash flow volatility. Profitability in commercial banks is determined by the abilityof the banks to retain capital, absorb loan losses, support future growth of assets and providereturn to investors (Qin & Pastory, 2012).

The owner of this investigation has chosen ROA as a measure of profitability for commercial banks as larger body of empirical literatures are proposing the determinants of bank profitability. This is has been exposed by a number of researchers while they were performing their research;(Almumani, 2013), (Funso, 2012), (Gizaw, 2015), (Bentum, 2012), (Ani et al.,2012), (Obamuyi,2013), ROA displays the profit earned per

dollar of assets which reflects bank's management ability to use the bank's financial and real investment resources to generate profits (Ani et al.,2012). (Gul, 2011), ROA means how real and efficient the management of banks has been as they seek to transform assets into earningsand the higher ratio indicates the higher performance of the banks. It is a ratio calculated by dividing net income by total assets. This ratio measurefor the operating efficiency for the company based on the firm's generated profits from its total assets (Kabajeh et al,2012).

Qin & Pastory, (2012) prearranged on commercial banks profitability and suggested that return on asset effectively reflects corporate profitability which can be used to evaluate the performance of management in the utilization of the assets. Basing on the argument made by Almumani (2013), that bank profitability is best measured by ROA because ROA cannot be distorted by high equitymultiplier. The ratio is considered as an indicator of how efficient a company is using its assetsto generate before contractual obligation must be paid. It also shows the ability of managementto acquire deposits at a reasonable cost and invest them in profitable investments.

3.6.3. Independent variables

Loan to asset ratio (LAR)

Asset arrangement of loans and advances, which are clarified by total loans to total asset, are the main source of income and measure the liquidity of bank assets tied up with loan. Other variables held constant, the more deposits are transformed into loans, the higher the interest margin and profits. Loans are the most important indicators of banks performance in the bank financial statements because they reflect the bank's primary activity (Ani et al., 2012).On the other hand, if increasing loans leads to higher funding requirements, a negative impact of the loan ratio on the banks profitability may accrue (Tesfaye, 2012). Credits deliver major means of earnings for commercial banks and it is often understood that the more banks offer loans the more it does generate revenue and more profit. These advances are anticipated to have a positive relationship with bank performance. However, empirical evidence on the relationship between loans and profitability is mixed up.

Investigators use advances and loan to whole asset ratio in order to assess bank activity on bank risk because bank loans are relatively illiquid and subject to default risk showing a positive relationship between total loan and the risk measures. In dissimilarity, relative improvements in Portfolio management strategies might propose that the ratio is negatively connected to bank risk measures. It is a variable measuring what percent of total assets is comprised by loans and it gauges the percentage of total assets the bank has invested in loans (or financings).

The writer expects a positive relation between loans and advances and profitability,as more loans would generate interest income for the bank (Ponce, 2013; Tesfaye, 2012).The ratio is also an indicator of liquidity risk which is measured by bank net loans to total assetsor a percentage of assets that comprise the loan portfolio. High ratios may be an indicative ofbetter bank performance because of possible increases in interest income. However, very highratios could also reduce liquidity and increase the number of marginal borrowers that default(Francis, 2013). Poor asset quality is perceived to cause capital erosion and increase credit risks. It is included in the study of the subject matter as an independent variable todetermine the impact of loans on banks profitability.

Liquid assets to total assets (LIQ):

As per Athanasoglou (2006) as cited by Andegzer, (2015), Liquidity risk will arise from the possible inability of a bank to accommodate decreases in liabilities or to fund increases on the assets' side of the balance sheet and is considered as an important determinant of bank profitability. Liquidity ratio is defined as the extent to which the banks funds are available to meet thewithdrawal demand of depositors. Banks need amounts of liquidity depending on their growthrate, variability in financing, deposit activities and the regulations of the Central Bank (Muda etal., 2013).

Deteriorating to fulfill liquidity obligation results in liquidity risk described as the risk offunding which is related to un expected event (Santomero, 1997) as cited by Li & Zou(2014). If the commercial banks arenot liquid enough, they will not respond the demands of credit from customers. Liquidity riskreduces the ability of the bank to meet its financial obligations as they fall due (Ojonget al, 2014).

This tells to reduce banks process and then profit of the bank. Now, the private commercial banks are not replying the demands of customers for credit on timely bases because of the credit cap set by NBE as well as Bill purchase for 27% of every disbursement of loan which impacts on their liquidity aspect negatively. This suggests that Liquidity risk is a serious factor that has an impact on the profitability of commercial banks and hence became a base to consider it as one variable. As per NBE directive No SBB/57/2014, any approved commercial bank shall preserve liquid assets of not less than fifteen percent (15%) of its net current liabilities.

Loan loss provision to total loan (LPR)

It is taken as one component of Portfolio because it is an pointer of asset quality in commercial banks representing how much of the total portfolio has been provided for but not charged off (Frederick, 2014) & (Nawaz,2012). Indicator shows that the higher the ratio, the poorer the quality and therefore the higher the risk of the loan portfolio will be. The proportion of loan loss provisions to total loans shows the level of Portfolio that the banks are exposing too. The relationship between loan loss provision and profitability is expected to be negative based on the concept that more bad loans reduce profitability. This is an amount of money that a bank set sideways from its annual earnings as a precaution against possible loss of a non performing loan, orto off-set a lost credit facility.

As designated by Buyuksarvarcl & Adioglu, (2011)as cited in Andegzer (2015) Loan loss stand-in is defined as a estimate reserve against a bank's total loans on the balance sheet, representing the amount thought to be adequate to cover estimated losses in the loan portfolio. We take in to consideration loan loss investments to gross loans ratio as a proxy of bank risk as this ratio may indicate the banks' financial health. A inverse impact of loan loss reserve in capital could mean that banks in financial distress have more difficulties in increasing their capital ratio. In contrast, a positive effect could signal that banks voluntarily increase their capital to a larger extent in order to overcome their bad financial situation.

Though advance loss provisions and increasing loss reserves provide early lines of defense againstbad loans, in the severe case where a bank may face a serious asset quality problem and loan lossreserves becomes insufficient to allow all bad loans to be written off, the excess will have to bewritten off against shareholder's equity (Elsiefy,2013).

Size of deposit (LOGD)

As it is known Bank deposits signify the most noteworthy constituents of the money supply used by the public, and changes in money growth are highly correlated with changes in the prices of goods and services in the economy. Banks as any other business organizations needs funds and this can be obtained by either debt or equity. But rising equity is more expensive or costly thanattracting deposits. There is a general notion that deposits are the cheapest sources of funds forbanks and have positive impact on banks profitability if the demand for bank loans is very high.

That is, the more deposits commercial bank is capable collect the greater is its capacity to offer more loans and make profits (Bentum, 2012). The idea of Bentum (2012) is also repeated byAlumia (2013) saying deposits and loans are the primary activity of a bank; the higher the rate of transforming deposit into loan, the higher will be the performance. Elias (2012) also say thatdeposits provide most of the raw materials for bank loan and hence the ultimate source of profitand growth is only viable when the deposits are transformed to loan at the required rate. But if the deposit collected is not converted to loan facility, performance will decline as the bank payinterest to the depositors.

Total capital to total assets ratio (CAR):

It is a must that Commercial banks are legally vital to maintain adequate capital funds as banks capital or net worth serves as a buffer against losses and failure. Reserve is one of the significant indicators for determination of the capital, which demonstrates the bank's capacity to cover losses (Erina & Lace, 2013). The main function of bank capital is to provide resources to absorb possible future losses and handle risk exposure of the shareholders on assets. The capital ratio, which is measured by total equity over total asset, reveals capital adequacy and should capture the general safety and soundness of the financial institution. In order to prevent bank failures and protect the interest of the

depositors, it is necessary to require banks to maintain a significant level of capital adequacy Buyuksarvarcl & Adioglu, 2011) as cited in Andegzer (2015).

Capital Adequacy Ratio (CAR) is quantity of the amount of bank's capital expressed as a percentage of its risk weighted creditexposure. It is taken as one independent variable as regulatory body considers as one corecomponent of financial strength and hence other researchers has also used as one component inthe evaluation of impact of Portfolio management on profitability of commercial banks (Afriyie& Aketey, 2012). Bank with good Capital Adequacy Ratio have good profitability (Ponce,2013). With good capital requirement, commercial banks are able to absorb loans that have gonebad.

Financial institutions like bank are consequently required to have adequate capital, not only to remain solvent, but to avoid the failure of the financial system (Abiola & Olausi, 2014). The ratio is "cushion" for potential losses, which defend the bank's depositors or other lenders (Tefera, 2011). CAR is expected to have a positive relation with performance because well capitalized banks are lessrisky and more profitable (Ani et al, 2008). For the current study CAR are calculated by TotalCapital/ Total Asset (Tesfaye, 2012),(Almumani, 2013), (Ani et. al,2008), (Murital & Taiwo,2013), Afriyie & Akotey, 2012).

Loan Growth (LGR)

Loan growth denotes to the change in a banks' loan collection. Growth in a banks' loan book is seen a noteworthy measure of managerial performance. There is a great positive relation of the average of previous loan growth to the simultaneous loan loss rate. In a preceding study, Salas & Saurina (2002) distinguished that loan growth of banks commerce with savings is positively related to loan losses three to four years ahead. The duo expressed that the relationship was not only positive but also significant. In hey another study, Foos et al,. (2009) as cited in Andegzer (2015) detected that a bank's loan growth can lead to an increased loan loss provisions during the subsequent three years resulting in reduced profitability.

3.7. Expectations of the Empirical result

The expectations of the author basing the theoretical frameworks of the variableswere tabulated below:-

	Variables	Measure	Notation	Expected Result
Dependent Variables	Profitability	Net income after Tax / Total Assets	ROA	
Independent Variables	Loan to asset ratio	Total Loans / Total Asset	LAR	+
	Liquidity	Liquid Assets / Total Assets	LIQ	+
	loan Loss Provision	Loan Loss Provision/Total Loan	LPR	-
	logarithm of Deposit	Total Size of Deposit	LogD	+
	Capital Adequacy ratio	Total Capital /Total Assets	CAR	+
	Loan Growth	%age change in total loan	LGR	+

Compiled by the author

From theoretical and empirical result, CAR is expected to have a positive relation with performance because well capitalized banks are less risky and more profitable (Ani et al, 2008)

CHAPTER FOUR

4. DATA ANALYSIS AND INTERPRETATION

This chapter deals with the results and analysis of the findings. The chapter contains two sections. The first section presents; presents the results on fulfillment of the classical linear regression model (CLRM) assumptions; the second section lays down the results of regression analysis that constitute the main findings of this study.

4.1. Descriptive statistics

I the following Table (table 4.1) gives as a summary of the descriptive statistics of the independent variables and independent variables for the seventeen Ethiopian commercial banks from the year 2015 to 2019 having 85 total observations. In the same table below, there are maximum, minimum, mean, standard deviation and number of observations of the independent and dependent variables.

Table 4.1 Descriptive statistics

Variable	Mean	Std. Dev.	Maximum	Minimum	Observations
ROA	0.03082	0.01227	0.067885	0.003167	85
LAR	0.49179	0.072037	0.633239	0.228803	85
LIQ	0.20148	0.06930	0.458994	0.022675	85
LPR	0.00804	0.010025	0.044137	0	85
LOGD	4.10076	0.727841	8.715158	2.913465	85
CAR	0.14179	0.043235	0.259515	0.020657	85
LGR	-0.40815	0.219472	0.122082	-1.23707	85

Source: - E-Views9 output

The above Table 4.1 indicates, average indicators of variables calculated from the financial statements of the banks under consideration and the standard deviation that expresses how much dispersion exists from the average value. According to Brooks, (2008), data points are tends to be very close to the mean with low standard deviation ,l P'' while high standard deviation shows that the data point are dispersed over a large ran"ge of values.

The mean value for the dependent variable ROA is 0.03indicating, on average Ethiopian commercial banks generated 3% profit on assets employed in the company. The standard deviation on the dependent variable ROA is 0.01 and implied that the volatility of returns from assets varies from the mean by 1% only.

The independent variables include LAR, LIQ, LPR, LOGD, CAR and LGR. The mean value for LAR 0.49 is indicating, on average , 49% of Ethiopian commercial banks asset is tied up on loan. The higher this ratio indicates a bank is loaned up and its liquidity is low and more risky a bank may be to higher defaults. The standard deviation on the dependent variable LAR is 0.07 and implied that the volatility loan to assets varies from the mean by 7% only. The mean value for LIQ 0.20 indicate on average Ethiopian commercial banks has 20% of the total asset is liquid indicating it can service debt and cover short-term liabilities if the need arises up to 20 % of the total asset. The LAR is leas than LQA, because not all loan are liquid. There are loans that are extended for medium term and long term. The mean value for LPR 0.008 indicating, on average Ethiopian commercial banks loan loss provision indicate allow for uncollected loans and loan payments is less than one percent of the provisions account from total loan. The mean value for LOGD 1,388,791.24[1]indicating, on average Ethiopian commercial banks has a deposit of it is asset is financed by leverage. The standard deviation on the independent variable LOGD is 317,672.66[2] and implied that the volatility of deposit varies from the mean by hundreds of thousands only.

The mean value of the independent variable CAR is 0.14179 indicating, on average Ethiopian commercial banks generated 14% of its asset from own capital(Equity) employed in the company. The standard deviation on the dependent variable CAR is 0.04 and implied that the volatility of capital adequacy ratio varies from the mean by 4% only. Under Basel III, the minimum capital adequacy ratio that banks must maintain is 8%. The capital adequacy ratio measures a bank's capital in relation to its risk-weighted assets. The capital-to-risk-weighted-assets ratio promotes financial stability and efficiency. The capital conservation buffer recommendation is designed to build up banks' capital, which they could use in periods of stress.

The mean value for the independent variable LGR is -0.40 indicating, on average loan growth in Ethiopian commercial banks decreased by 40%.While,the standard deviation on the dependent variable LGR (loan growth) is 0.21and implied that the volatility of loan growth ratio varies from the mean by 21% only.

[1] Dlog is 4.01= antilog for average deposit1,388,791.24

[2] Dlog standard deviation=antilog for average deposit standard deviation of Dlog 317,672.66

4.2. Regression Model tests

For valid hypothesis testing and reliable results while using CLRM model require to pass certain diagnostic tests. Hence, the study has gone through the most acute regression diagnosis examination consisting of autocorrelation, , Multicollinearity, heteroskedasticity, Normality and model specification.

To keep the data validity and robustness of the result of regression of the research, the main classical linear regression model (CRLM) assumptions should be tested to identify any misspecification and correcting them so as to enhance the research quality Brooks, (2008). There are different classical linear regression model assumptions that need to be tested in this study, those includes : normality, autocorrelation, errors equal zero mean test, homoscedasticity and multicollinearity.

4.2.1. Test for heteroscedasticity assumption (var (ut) = σ2 <∞)

One of the CLRM (classic linear regression model) condition implies that there shouldn't be hetroscedasticity between the two variables. Heteroscedasticity means that error terms do not have a constant variance. If heteroscedasticity is not occurred, the estimators of the ordinary least square method are efficient and the hypothesis testing is reliable or valid, but if there is heteroscedasticity, the reverse is true as it will underestimate the variances and standard errors.(Brooks,2008) There are many tests to detect the Heteroscedasticity problem, among them, Breusch-Pagan-Goldfrey Test, White's Test , Park Test, Glesjer Test, and Autoregressive Conditional Heteroscedasticity (ARCH) test. In this study, the known Breusch-Pagan-Goldfrey Test has been used to test for the presence of heteroscedasticity. The hypothesis for the Heteroskedasticity test has been formulated as follow:

H^0: There is no Heteroskedasticity problem in the model.

H^1: There is Heteroskedasticity problem in the model.

$\alpha = 0.05$

Decision Rule: Reject H^0 if P-value is less than significance level. Otherwise, do not reject H^0.

Table 4.2: Heteroskedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.507623	Prob. F(6,77)	0.1869
Obs*R-squared	8.830677	Prob. Chi-Square(6)	0.1833
Scaled explained SS	6.523733	Prob. Chi-Square(6)	0.3671

Source: - E-Views9 output

Both F-statistic and chi-square (χ^2) tests statistic were used. As can be presented in the above table Table 4.2, Heteroskedasticity test, both the *F*-statistic and *chi-square* test statistics gives the same conclusion which is there is no evidence for the existence of Heteroscedasticity. As the *p*-values in all of the cases were above 0.05, the null hypothesis of homoskedasticity is not rejected at 5 percent of significant level. The implication of this is that there is no significant evidence for the existence of heteroscedasticity in this research models. The third version of the test statistic, "scaled explained SS", which as the name suggests is based on a normalized part of an explained sum of squares from the auxiliary regression, also gives the same conclusion. (See Appendices for detail).

4.2.2. Test for absence of autocorrelation assumption (cov(ui , uj) = 0 for i _ j)

Another main regression model assumption says that, the covariance between error terms must be zero. This means that error term should be random and it shouldn't shows any kind of pattern. If there exists covariance between the residuals and it is non-zero, this fact is called autocorrelation. Brooks, (2008) when the error term for any observation is related to the error term of other observation, it indicates that autocorrelation problem exist in this model. In the case of autocorrelation problem, the estimated parameters can still remain unbiased and consistent, but it is inefficient. The result of T-test, F-test or the confidence interval will become invalid due to the variances of estimators tend to be underestimated or overestimated. Due to the invalid hypothesis testing, it may lead to misleading results on the significance of parameters in the model. In this study to test for the existence of autocorrelation, the popular Breusch-Godfrey Serial Correlation LM Test was employed.

H0: There is no autocorrelation problem in the model.

H1: There is autocorrelation problem in the model.

$\alpha = 0.05$

Decision Rule: Reject H0 if p-value less than significance level. Otherwise, do not reject H0.

Therefore, to check the presence of autocorrelation in this study, the researcher used Breusch–Godfrey test.

Table 4.3: Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.583248	Prob. F(2,75)	0.5606
Obs*R-squared	1.286466	Prob. Chi-Square(2)	0.5256

Source: - E-Views9 output

As can be seen in the above table 4.3, F test result and the P value of F-statistic are 0.5606&0.5256 respectively. The values are way beyond the significance level of 5%. Hence, the null hypothesis of no autocorrelation is failed to reject at 5 percent of significant level. This implying that there is no significant evidence for the presence of autocorrelation in both models. The Chi-Square P-value of the models are also supports the absence of autocorrelation. (See Appendices for detail). Therefore, can be concluded that, the covariance between residuals is zero, data is normal and absence of autocorrelation problem was found conclusively from the LM test.

4.2.3. Test of normality (ut ~N(0, σ2))

Normality test was applied to determine whether a data is well-modeled by a normal distribution or not, and to compute how likely an underlying random variable is to be normally distributed. If the residuals are normally distributed, the histogram should be bell-shaped and the Jarque-Bera statistic would not be significant. This means that the p-value given at the bottom of the normality test screen should be greater than 0.05 to support the null hypothesis of presence of normal distribution at the 5% level. Theoretically, if the test is not significant, then the data are normal, so any value above 0.05 indicates normality. Skewness measures the extent to which a distribution is not symmetric about its mean value. Kurtosis refers to the peakedness of the distribution. For a normal distribution the kurtosis value is 3. Kurtosis measures how flat the tails of the distribution are, the Jarque–Bera test for normality is based on two measures, Skewness and kurtosis. The Jarque-Bera probability statistics/P-value is also expected not to be significant even at 10% significant level Brooks (2008). The hypothesis for the normality test was formulated as follow:

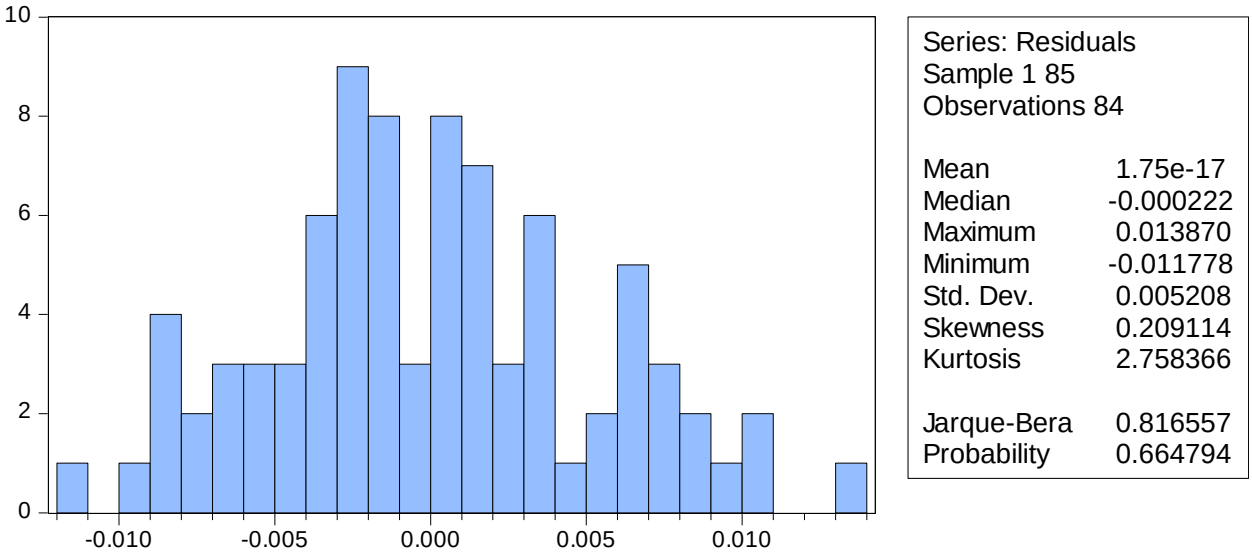
H0: Error term is normally distributed

H1: Error term is not normally distributed

$\alpha = 0.05$

Decision Rule: Reject H0 if p-value of JB test less than significance level. Otherwise, do not reject H0.

Figure 4.1 Normality test for residuals



Source: - E-Views9 output

As shown in the above histograms Figure 4.1, Kurtosis values are 2.75. The Skewness measures on both models are 0.20 is close to zero and implied the normality of the data. More importantly, the Jarque-Bera statistics was not significant even at 10% level of significance for both models, as per the P-values shown in the histograms are way beyond 10% i.e. 0.66. This is therefore the null hypothesis of the residuals follows a normal distribution is failed to reject at 5 percent of significant level. Hence, it seems that the error term in all of the cases follows the normal distribution and it implies that the inferences made about the population parameters from the samples tend to be valid.

4.2.4. Test for Multicollinearity

Multicollinearity indicates a linear relationship between explanatory variables which may cause the regression model biased (Gujarati, 2004). If an independent variable is an exact linear combination of the other independent variables, then we say the model suffers from perfect collinearity, and it cannot be estimated by OLS Brooks (2008). When independent variables are multicollinear, there is overlap or sharing of predictive power. This may lead to the paradoxical effect, whereby the regression model fits the data well, but none of the explanatory variables (individually) has a significant impact in predicting the dependent variable Gujarati, (2004). In other words if the multicollinearity occurs, the

regression model is unable to tell which independent variables are influencing the dependent variable. The consequences of Multicollinearity are large variances and covariance of OLS estimators, wider confidence interval, insignificant t ratio, high $R2$ but few significant t ratio, sensitivity of OLS estimators and their standard errors to small changes in data. There is no one unique method to detect the multicollinearity problem, it only have some rules of thumb, which are high $R2$ but few significant t ratio, high pair wise correlation coefficient and Variance Inflation Factor (VIF) or Tolerance (TOL). This study used high pair-wise correlation coefficients method to test the presence of multicollinearity problem in a regression modelbecause it can see the correlation of independent variables between each other one by one. If the correlation coefficient was higher than 0.8, the model would be considered as it consists of serious Multicollinearity problem Guajarati (2004).

Table 4.4: Correlations matrix of explanatory variables

	LAR	LIQ	LPR	LOGD	CAR	LGR
LAR	1					
LIQ	-0.27063	1				
LPR	0.08553	-0.18895	1			
LOGD	-0.03064	-0.65874	0.381753	1		
CAR	-0.01016	0.476863	-0.24688	-0.63384	1	
LGR	-0.15234	-0.04584	0.12243	0.381785	-0.23412	1

Source: - E-Views9 output

The Pearson correlation, which varies between -1 and 1, if the p-value is 0, there is no linear correlation, and if the p-value is -1 or 1 we have a perfectly negative or positive relationship between the variables. According to Pallant (2005), the results in the above correlation matrix table 4.5 shows the highest correlation of 0.65874 which is between liquidity (LIQ) and total deposit (LOGD). Since there is no correlation above 0.8 in this study according to Cooper and Schendlar (2003) and Lewis-Beck (1993), it can be concluded there is no problem of multicollinearity, thus enhanced the reliability for regression analysis.

4.2.5. Model Specification

According to Brooks (2008), Specification error occurs when omitting a relevant independent variable, including unnecessary variable or choosing the wrong functional form, so that

regression model will be wrongly predicted. If the omitted variable is correlated with the included variable, the estimators are biased and inconsistent. If the omitted variable is not correlated with the included variable, the estimators are unbiased and consistent. Ramsey RESET test was used to see whether the developed model is correctly regressing.

H_0: the model is correctly specified

H_1: the model is not correctly specified

$\alpha = 0.05$

Decision Rule: Reject H_0 if p-value is greater than significance level. Otherwise, do not reject H0.

Table 4.5: Result of model specification Test: Ramsey-RESET test

Ramsey RESET Test
Equation: UNTITLED
Specification: ROALARLIQLPRLOGDCARLGR C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.593056	76	0.1153
F-statistic	2.537827	(1, 76)	0.1153
Likelihood ratio	2.759152	1	0.0967

Source: - E-Views9 output

From table 4.5 it can be concluded that this research do not reject null hypothesis (H0), since the p value t-statistic, F-statistic and Likelihood ratio is 0.1153 and 0.0967 , which is greater than significance level of 0.05. Thus, it can be concluded that the model specification is correct from year 2005 to 2013. Overall reliability and validity of the model was enhanced further by the Prob (F-statistic) value of 0.000000.

4.2.6. Choosing Random effect (RE) Vs. fixed effect (FE) models

The results so far indicate that all CRLM assumptions are not violated, so the ordinary least square regression can be safely applied. However, since this study uses a panel data, there are two types of panel estimator approaches that can be employed, namely: fixed effects models (FEM) and random effects models (REM) Brooks, (2008). The simplest types of fixed effects models allow the intercept in the regression model to differ cross-sectionally but not over time, while all of the slope estimates are fixed both cross-sectionally and over time. The random effects approach proposes different intercept terms for each entity and again these intercepts are constant over time, with the relationships between the explanatory and explained variables assumed to be the same both cross-sectionally and temporally (Brooks, 2008).To examine whether individual effects are fixed or random, a Hausman specification

test was conducted providing evidence in favor of the REM model (Baltagi ,2005). The null hypothesis for this test is that unobservable heterogeneity term is not correlated or random effect model is appropriate, with the independent variables. If the null hypothesis is rejected then we employ Fixed Effects method (Brooks,2008).To determine whether the fixed effects are necessary or not this study run the Hausman specification test as recommended by brooks (2008) and others. The hypothesis for the model selection test was formulated as follow;

H_0: Random effects model is appropriate.

H_1: Fixed effects model is appropriate.

$\alpha = 0.05$

Decision Rule: Reject H_0 if P value is less than significant level 0.05. Otherwise, do not reject H_0.**Source: - E-Views9output**

Table 4.6 Hausman test of Model

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	7.725094	6	0.2589

Source: - E-Views9output

Table 4.6 above shows that, Hausman specification test, the P-values of a specified panel model is 0.2589. The values are way beyond the 5% level of significance. Hence, the null hypothesis of the random effect model is appropriate is failed to reject at 5 percent of significant level. This implies that, the random effect model is more appropriate than the fixed effect model and gives more comfort for both models. (See Appendices for detail).

4.3. Discussion of Regression results

The empirical evidence on the determinants of Ethiopian commercial banks' non-performing loan is studied based on balanced panel data, where all the variables are observed for each cross-section and each time period. The study has a time series segment spanning from the period 2015 up to 2019 and across section segment which considered seventeen commercial banks in Ethiopia. To test the relationship between the effect of portfolio management on financial performance ofEthiopian commercial banks variables the following linear regression model is developed.

$$ROA = \beta_0 + \beta_1 LPR + \beta_2 LTA + \beta_3 CAR + \beta_4 LAR + \beta_5 LGR + \beta_6 LOGD + \mu$$

Table 4.7 Random effects regression results model

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Sample: 2015 2019
Periods included: 5
Cross-sections included: 17
Total panel (unbalanced) observations: 84
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAR	-0.013872	0.011584	-1.197467	0.2348
LIQ	0.023970	0.012736	1.882101	0.0636
LPR	0.148836	0.065572	2.269799	0.0260
LOGD	0.005312	0.003119	1.702789	0.0926
CAR	0.241805	0.030676	7.882429	0.0000
LGR	-0.017974	0.002872	-6.258370	0.0000
C	-0.031436	0.019036	-1.651437	0.1027

Effects Specification		
	S.D.	Rho
Cross-section random	0.003318	0.3484
Idiosyncratic random	0.004538	0.6516

Weighted Statistics			
R-squared	0.678876	Mean dependent var	0.016206
Adjusted R-squared	0.653854	S.D. dependent var	0.007744
S.E. of regression	0.004590	Sum squared resid	0.001622
F-statistic	27.13048	Durbin-Watson stat	1.847221
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.811184	Mean dependent var	0.030993
Sum squared resid	0.002346	Durbin-Watson stat	1.276883

Source:E-views 9 Output

The estimation results reported in Table 4.7 in the previous page depicted that, the R-squared and adjusted R-squared values are 0.67 and 0.65 respectively is an indication that the model is a good fit. This means on average65% of variations in financial performance indicator i.e. return on asset ratio, of Ethiopian commercial banks were explained by independent variables included in the model. However, the remaining 35% changes are caused by other factors that are not included in the model. Furthermore, the F-statistic was 27.13 and the probability of not rejecting the null hypothesis that there is no statistically significant relationship existing between the dependent variable (ROA) and the independent variables, is 0.000000 indicates that the overall model is significant at

1% and hence all the independent variables jointly are significant in causing variation in return on asset of Ethiopian commercial banks.

The panel random effect estimation regression result in table 4.7 also shows that, coefficient intercept (α) is -0.031. This means, when all explanatory variables took a value of zero, the average value ROA would be take -0.031 unit and statistically insignificant at 5% level of significance.

A. Loan to asset ratio (LAR) and return on asset (ROA)

As shown in the regression output presented in Table 4.7, the coefficient of Loan to asset ratio (LAR) as measured by total Loans and total Asset ratio is -0.013 but its corresponding P-value is 0.2348. Meaning that holding other independent variables fixed at their average value, when Loan to asset ratio (LAR) increase by one unit, Ethiopian commercial banks return on Asset (ROA) will decrease by 0.013 unit but statistically insignificant at 5% level of significance. Therefore, the study reject the first hypothesis H1 that, there is a significant positive relationship between the Loan to asset ratio (LAR) of Ethiopian commercial banks and their financial performance measure (ROA).This means, there is no sufficient evidence to support positive relationship between ROA and LAR. This finding is similar to the finding of Tesfaye, (2012) however a negative association between profitability and loan to asset ratio indicate the higher the ratio gets the bank is taking a path of being more risky to default however the relationship is insignificant to cause get the bank in serious trouble. The possible cause of the result is that the increasing political tensions in the last few years as well as the mandatory cap of the NBE bill is making the banks to lose the profitability as the bank increase a loan. the study of IMF shows that, the political instability in developing countries leads banking system loans to be non performing loans which resulted in decrease in financial performance.

B. Liquid to asset ratio (LIQ) and return on asset (ROA)

As shown in the regression output presented in Table 4.7, the coefficient of liquidity ratio (LIQ) as measured by total liquidity and total Asset ratio is 0.023 but its corresponding P-value is 0.0636. Meaning that holding other independent variables fixed at their average value, when Liquidity to asset ratio (LIQ) increase by one unit, Ethiopian commercial banks return on Asset (ROA) will increase by 0.023 unit but statistically insignificant at 5% level of significance. Therefore, the study reject the first hypothesis H2 that, there is an insignificant positive relationship between the Liquidity to asset ratio (LIQ) of Ethiopian commercial

banks and their financial performance measure (ROA).This means, there is no sufficient evidence to support positive significant relationship between ROA and LIQ. The commercial banks should maintain liquid assets not less than fifteen percent (15%) of its net current liabilities. Whereas,credit cap set by NBE as well as Bill purchases for 27% of every disbursement of loan which impacts on their liquidity aspect adversely. Despite the circumstances the liquidity has insignificant association with profitability.

C. Loan Loss Provision Ratio (LAR) and Return on Asset (ROA)

As shown in the regression output presented in Table 4.7, the coefficient of Loan Loss Provision Ratio (LAR) as measured by loan loss provision and total loan ratio is 0.148 and its corresponding P-value is 0.0260. Meaning that holding other independent variables fixed at their average value, when Loan Loss Provision Ratio (LAR) increase by one unit, Ethiopian commercial banks return on Asset (ROA) will increase by 0.148 units and statistically significant at 5% level of significance. Therefore, the study rejects the third hypothesis H3 that, there is a significant negative relationship between the Loan Loss Provision Ratio (LAR) of Ethiopian commercial banks and their financial performance measure (ROA).

According to Elsiefy (2013) the loan loss provisions and cumulative loss reserves provide early lines of defense against bad loans, in the severe case where a bank may face a serious asset quality problem and loan loss reserves becomes insufficient to allow all bad loans to be written off, the excess will have to be written off against shareholder's equity. Furthermore,It is used as one component of Portfolio because it is an indicator of asset quality in commercial banks indicating how much of the total portfolio has been provided for but not charged off (Frederick, 2014) & (Nawaz, 2012). The result above contradicts the theory as well as empirical result. The result imply that due to the commercial banks demand of sufficient collateral to backup the loan which might worth sometimes more than the loan balance sometimes not less the bank would have unlikely lose the loan and can recover the loan loss provision even if the provision meant to turn into uncollectable the bank is beneficiary of the circumstance the positive association between the loan loss provision with the profitability is evident of that.

D. Total Size of Deposit (LogD) and return on asset (ROA)

As shown in the regression output presented in Table 4.7, the coefficient of Total Size of Deposit (LogD) as measured by Logarithm of Total Size of Deposit is 0.005312 but its

corresponding P-value is 0.0926. Meaning that holding other independent variables fixed at their average value, when Loan to asset ratio (LAR) increase by one unit, Ethiopian commercial banks return on Asset (ROA) will increase by 0.005312 unit but statistically insignificant at 5% level of significance. Therefore, the study reject the fourth hypothesis H4 that, there is a significant positive relationship between the Total Size of Deposit (LogD) of Ethiopian commercial banks and their financial performance measure (ROA).This means, there is no sufficient evidence to support positive relationship between ROA and (LogD). This finding is similar to the finding of Opoku et.al, (2014) who asserted a low contribution of deposit to profitability. Rose (2002), Ayele, (2012), Koch & Macdonald, (2014) contend various external factors affect the effect of deposit on profitability hence, during the study period the political and economic condition were highly volatile due to a reshuffle in the government unlike the demand of credit in the boom time there were high uncertainties in the future going concern of many businesses. Secondly, the change in regulation specifically change in real interest rate on saving and movement of money as well as competition between commercial banks were monumental and to compensate the drawback of external factors banks may pay high interest to obtain these resources which are the possible reason for the insignificant association between deposit and profitability in the study.

E. Capital Adequacy Ratio (CAR) and Return on Asset (ROA)

As shown in the regression output presented in Table 4.7, the coefficient of Capital to asset ratio (CAR) as measured by total capital and total Asset ratio is 0.241805 and its corresponding P-value is 0.0000. Meaning that holding other independent variables fixed at their average value, when capital to asset ratio (CAR) increase by one unit, Ethiopian commercial banks return on Asset (ROA) will increase by 0.241805 unit and statistically significant at 1% level of significance. Therefore, the study accepts the fifth hypothesis H5 that, there is a significant positive relationship between the Capital Adequacy Ratio (CAR) of Ethiopian commercial banks and their financial performance measure (ROA).This means, there is sufficient evidence to support positive relationship between ROA and CAR. This finding is similar to the finding of Sri Windarti Mokoagow (2015), Yeyen Kumalasari (2016) Iskandar et al. (2016),Ajayi, et al.,(2019) who state banks' regulators focus on Capital Adequacy as the ratio explains efficiency or otherwise in the use of assets by the Bank (Richards and Stewart, 1996). The positive significant result confirms the bank has ensure that banks have enough cushion to absorb a reasonable amount of losses before they

become insolvent as well as more importantly the NBE dictates the commercial banks to maintain 8% while according to the studies result on Table 4.1 the mean CAR is 14% which indicate on average the banks maintain above the required risk weighted assets ratio. The results possible justification suggests that banks with more equity capital are perceived to have more safety and such advantage can be translated into higher profitability the higher CAR ratio, the more profitable the bank will be.

F. Loan Growth (LGR) and Return on Asset (ROA)

As shown in the regression output presented in Table 4.7, the coefficient of Loan Growth (LGR) as measured by percentage growth of loan is -0.017974 and its corresponding P-value is 0.0000. Meaning that holding other independent variables fixed at their average value, when Loan Growth (LGR) increase by one unit, Ethiopian commercial banks return on Asset (ROA) will decrease by -0.017974 unit and statistically significant at 1% level of significance. Therefore, the study rejects the sixth hypothesis H6 that, there is a significant positive relationship between the Loan Growth (LGR) of Ethiopian commercial banks and their financial performance measure (ROA).This means, there is no sufficient evidence to support positive relationship between ROA and LGR. This finding is similar to the finding of previous empirical research by Paul Kiama Thiong'o (2017) who found inverse relationship between loan growth and financial performance in Kenya. The studies result entail the growth rate of loan has been year after year due to mainly the uncertainty in the business due to the political distabelity, The NBE mandatory purchase of bill of 27% which is repealed in 2019 through Directive No. MFA/NBEBILLS/004/2019 that constrained the banks to perform with the full efficiency and increasing in the loss provision in banks are some of the possible reasons for the result of the study.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

The main objective of the study was to examine the effect of portfolio management on financial performance of Ethiopian commercial banks. Therefore, based on the analysis and interpretations made at the pervious chapter the following conclusions and recommendation are made.

5.1. Conclusion of the Study

The descriptive statistics of independent and dependent was analyzed using mean. While, the other research questions were analyzed using multiple regression and classical linear regression that are included (model specification, autocorrelation, multicollinearity, hetroskedasticity and normality).

Five years audited financial statement data ranging from 2015 to 2019 G.C were collected from each of the sampled banks.

The descriptive result on Table 4.1 indicateson average Ethiopian commercial banks generated 3% profiton the total assets employed by thebanks. The loan to asset ratio imply on average 49% of the banks is asset is financed by leverage.The liquidity of Ethiopian commercial banks indicate on average 20% of the total asset is liquid indicating it can service debt and cover short-term liabilities if the need arises up to 20 % of the total asset.The loan loss provision is 0.008 indicating the allowance for uncollected loans and loan payments is less than one percent of the provisions account from total loan. The mean value for deposit is Birr 1,388,791.24 indicating, on average Ethiopian commercial banks has a deposit of it is asset is financed by leverage. The capital adequacy ratio employed is 14% implying the bank's capital in relation to its risk-weighted assets which is above the recommended Under Basel III, the minimum that must be maintained by the banks 8%. The loan growth in Ethiopian commercial banks indicate on average 40% decreased is registered by the commercial banks compared with the previous year’s loan during the study period.

The estimation results reported in the multiple regression result indicate adjusted R-square on average captures 65% of variations in financial performance indicator i.e. return on asset ratio, of Ethiopian commercial banks were explained by independent

variables included in the model (Loan to asset ratio (LAR),Liquid to asset ratio (LIQ), Loan Loss Provision Ratio (LPR), Total Size of Deposit (LogD), Capital Adequacy Ratio, and LoanGrowth (LGR)).

The Loan to asset ratio indicate a negative insignificant relationship with profitability showing the loan to asset ratio increase is actually have an adverse but insignificant relationship implying the higher the ratio gets the adverse the relationship with profitability. Similarly, the liquidity ratio indicates positive but insignificant association with profitability. The possible cause of the results is that the increasing political tensions in the last few years as well as the mandatory cap of the NBE bill is making the banks to affect profitability in every disbursement of loan and liquidity adversely.

The loan loss provision show positive and significant relationship with profitability of the bank. The result contradicts the theory as well as empirical result. The result imply that due to the commercial banks demand of sufficient fixed asset which might worth sometimes more than the loan balance not less the bank would have unlikely to lose the loan and can recover the loan loss provision easily.

Total deposit indicate positive insignificant association with profitability the result is an evident of the external factors affect the effect of deposit on profitability during the study period the political and economic condition were highly volatile due to a reshuffle in the government unlike the demand of credit and deposit decline like the boom time there were high uncertainties in the future going concern of many businesses. Secondly, the change in regulation specifically change in real interest rate on saving and movement of money as well as competition between commercial banks were monumental and to compensate the drawback of external factors banks may pay high interest to obtain these resources which are the possible reason for the insignificant association between deposit and profitability in the study.

The capital adequacy ratio indicates a positive and significant association with profitability. The results indicate that banks with more equity capital are perceived to have more safety and such advantage can be translated into higher profitability the higher CAR ratio, the more profitable the bank will be.

Lastly, the effect of loan growth on profitability has adverse significant relationship with profitability the political instability and mainly the mandatory NBE bill purchase has

decrease the level of loan granted to the customer of the banks were constrained the banks to perform with the full efficiency which is reflected in the study's result. Furthermore (Memru, 2014) warn there will be decline trend in the share of loans from the total asset could have negative effect on the long run but to some extent tone down by the maturity of part of the bills in few years' time.

5.2. Recommendations

The purpose of the study was to examine the effect of portfolio management on financial performance of Ethiopian commercial banks. The loan Loss Provision, Capital Adequacy ratio and Loan Growth areclearly the ones that the affect profitability of the commercial Banks. Based on the findings, the following recommendations, which are necessary for the betterment of the commercial banks of Ethiopia, are put forwarded:

- The regulatory body NBE should amend various rules as per the countries socioeconomic as well as the capacity of the commercial banks. The NBE purchase of bill has last couple of years knowing that it has an adverse effect the rules on profitability. Hence, the regulatory body needs to play more proactive role in the process and growth of banks specifically portfolio management.
- The Banks need to consider the strength of collateral while providing the loan.

.

Reference

Abiola, I. & Olausi, A. S (2014), *"The Impact of Credit Risk Management on the Commercial Banks Performance in Nigeria",* International Journal of Management and Sustainability, 3(5), 295-306.

Ahmed Razaul Mustafa et al.(2012),*"Does the Loan Loss Provision Affect the Banking Profitability in case of Pakistan?",* Asian Economic and Financial Review, 2(7), pp. 772- 783

Ani, W. U. et al. (2012), *"an empirical assessment of the determinants of bank profitability in Nigeria: bank characteristics panel evidence"*, Journal of Accounting and Taxation, 4(3), pp 38-43, DOI: 10.5897/JAT11.034

Antonio Trujillo-Ponce (2013). *"What determines the profitability of Banks: Evidence from Spain",* Accounting & finance, 53(2013), pp. 561-586. Pablo de Olavide University, Doi: 101111j/.1467-629X.2011.00466.X

Ayele, H. N. (2012). "*Determinants of bank profitability: An empirical study on Ethiopian private commercial banks"*. Unpublished MBA Thesis, Addis Ababa University.

Ajayi, Samuel Olatayo, Ajayi, Henry Folusho,Enimola, Dare Joseph, Orugun, Fausat Ibidunni(2019),*Effect of Capital Adequacy Ratio (CAR) on Profitability of Deposit Money Banks (DMB's): A Study of DMB's with International Operating License in Nigeria*,Research Journal of Finance and Accounting Vol.10, No.10,ISSN 2222-1697 (Paper),ISSN 2222-2847 (Online)

Bentum, W. (2012) *"The determinants of profitability of the commercial banks in Ghana during the recent years of global financial crisis"* Master thesis, Aarhus University

Charles O, Kenneth UO (2013), *"Impact of credit risk management and capital Adequacy on the financial performance of commercial bank in Nigeria"*, Journal of Emerging Issues Econ Finance bank 2(3) http://www.globalbizresearch.com/.../22882_JEIEFB_OGBOI

Ejoh, Ndifon Ojong et al. (2014). *"The Impact of Credit and Liquidity Risk Management on the Profitability of Deposit Money Banks in Nigeria",* International Journal of Economics, Commerce & Management, 2(9), PP.1-15

Elsayed Elsiefy (2013),*"Determinants of Profitability of Commercial Banks in Qatar: Comparative Overview between Domestic Conventional and Islamic Banks during the period 2006- 2011",* International Journal of Economics and Management Science, 2(11), PP. 108-142

Funso et. al., K. (2012),*"Credit Risk and Commercial Banks Performance in Nigeria:A Panel Model Approach"*. Australian Journal of Business and Management Research, 2(2), 31-38.

Girma Mekasha, 2011 *"Credit risk management and its impact on performance, on Ethiopian commercial banks"* 2011

Grace N.M Wangi (2012). *"The Effect of Credit Risk Management on the Financial Performance of Commercial Banks in Kenya",* Master of Business Administration, University of Nairobi

Harrison Owusu Afriyie & Joseph Oscar Akotey (2012). *"Credit Risk Management and Profitability of Selected Rural Banks in Ghana"*, PP. 1-18

Hosna, A., Bakaeva, M. and Sun Juanjuan (2009), *"Credit Risk Management and Profitability in Commercial Banks"*, Master Degree Project No. 2009:36, School of Business, Economics and Law, University of Gothenburg.

Jana Erina and Natalja Lace (2013),*"Commercial Banks Profitability Indicators: Empirical Evidence from Latvia",*Research Article, (2013), pp.1-9. DOI: 10.5171/2013.873515

Josiah Aduda & James Gitonga (2011), *"The relationship between credit risk management and profitability among commercial banks in Kenya",* Journal of modern accounting and auditing, ISSN 1548-6583, Vol.7, No.9, 934-946, retrieved from http://www.davidpublishing.com/

Kamau, P.N (2010), *"Research on adoption of risk management by commercial banks in Kenya"* Unpublished MBA project, School of Business, University of Nairobi, (2010)

Keeton, W. (2009) *"Does faster loan growth lead to higher loan losses? Federal Reserve Bank of Kansas City"* Economic Review, 2, 57-75

Koch, T. W., & MacDonald, S. S. (2014). *Bank management.* Nelson Education.

Li & Zou, 2014, *"The Impact of Credit Risk Management on Profitability of Commercial Banks",* Proceedings of the undergraduates research conference, pp 1-5, 2014

Majed Abdel Majid Kabajeh et al.(2012)The , *"Relationship between the ROA, ROE and ROI Ratios with Jordanian Insurance Public Companies Market Share Prices",* International Journal of Humanities and Social Science,2(11), pp.115-120

Million Gizaw (2015),*"The Impact of Credit Risk on Profitability Performance of commercial banks in Ethiopia",* African Journal of Business Management, 9(2), pp 59-66, Doi:10.5897/AJBM2013.7171

Mohammad Abdelkarim Almumani (2013). "*Impact of Managerial Factors on Commercial Bank Profitability: Empirical Evidence from Jordan"* An International Journal of Academic research in Accounting, Finance & Management Sciences, 3 (3), PP 298-310

Mohammad Abdelkarim Almumani (2013),*"Impact of Managerial Factors on Commercial Bank Profitability: Empirical Evidence from Jordan",* An International Journal of Academic research in Accounting, Finance & Management Sciences,3 (3), PP 298-310

Munyambonera Ezra Francis (2013),*"Determinants of Commercial Banks Profitability in Sub-Saharan Africa",*International Journal of Economics & Finance, 5(9), PP.114-147 DOI: 10.5539/ijef.v5n9p134

Memru Tesfaye (2014), "*The impact of NBE bills purchase on the profitability of private commercial banks: An Empirical Study on Ethiopian Private Commercial"*Addis Ababa University,URI: http://localhost:80/xmlui/handle/123456789/13577

National Bank of Ethiopia (2007), *"Asset Classification and Provisioning"*, Directive No SBB/43/2007, Addis Ababa, Ethiopia,

National Bank of Ethiopia, (2008),*"Asset Classification and Provisioning"*, PP.1-20 Addis Ababa, Ethiopia

National Bank of Ethiopia, (2008), *"Banking Supervision Proclamation No. 592/2008"*, Addis Ababa, Ethiopia

National Bank of Ethiopia (2010), "*Revised Risk Management Guidelines",* Bank Supervision Directorate, Addis Ababa, Ethiopia

National Bank of Ethiopia (2013), *"Reserve Requirement, 6th Replacement",* Directive No SBB/55/2013 Addis Ababa, Ethiopia

National Bank of Ethiopia, (2015) *"Annual report",* Addis Ababa Ethiopia

National Bank of Ethiopia, (2016), *"Annual Report",* Addis Ababa, Ethiopia

Nawaz, M. A (2012), *"Credit risk and the performance of Nigeria",* Interdisciplinary Journal of Contemporary Research, 4(7), 49-63

Nega Andegzer (2015), *"Impact of credit risk management on profitability of private commercial banks in Ethiopia"* St. Mary's university school of graduate studies, Addis Ababa, Ethiopia.

Nsambu Kijjambu Frederick,(2014),*"Factors Affecting Performance of Commercial Banks in Uganda- A Case for Domestic Commercial Banks",* Proceedings of 25th International Business Research Conference, Cape Town, South Africa, ISBN: 978-1-922069-42-9

Oldfield & Santomero, O. G. (2000), *"Risk management in financial institutions"*Sloan Management Review, 39(1), 33-46.

Poudel, R. (2012*),"The impact of credit risk management on financial performance of commercial banks in Nepal",* International Journal of Arts and Commerce, 1(5), pp. 9-15

Raghuram G. Rajan. 1994 *"Why bank credit policies fluctuate: A theory and some evidence"* The Quarterly Journal of Economics, 109(2):399–441, 1994

Richard, A.B. & Stewart, C.M. (1996). *"Principles of Corporate Finance",*McGraw-Hills Companies

Rose, P. S. (2002). *Commercial Bank Management,*McGraw-Hill/Irwin.

Salas, V. and Saurina, J. (2002),*"Credit Risk in Two Institutional Regimes: Spanish Commercial and Savings Banks",*Journal of Financial Services Research, 22(3), 203-224.

Samy Ben Naceur, (2003),*"The Determinants of the Tunisian Banking Industry Profitability: Panel evidence"*

Sehrish Gul et al.,(2011). *"Factors Affecting Bank Profitability in Pakistan",* The Romanian Economic Journal,4(39), PP.61-87

Taiwo Adewale Muritala & Abayomi Samuel Taiwo (2013). *"Credit Management Spur Higher Profitability? Evidence from Nigerian Banking Sector",* Journal of Applied Economics and Business, 1(2), pp.46-53

Tamru Belete,(2013). "*Asset Liability Management and Commercial Banks Profitability in Ethiopia",*Research Journal of Finance & Accounting, 4(10), pp.77-91

Tariq, W., Muhammad, U., Haseeb, Z., Inam, A. & Imran A. (2014) *"Determinants of Commercial Banks Profitability: Empirical Evidence from Pakistan"*. International Journal of Accounting and Financial Reporting, 4 (2), 1- 22

Tibebu Tefera 2011 *"Credit risk management and profitability of commercial banks in Ethiopia"* 2011

Tomola Marshal Obamuyi (2013) *"Determinants of Banks Profitability in a developing Economy: Evidenced from Nigeria",* Organizations and Markets in Emerging Economies, 4 (2), PP.97-111.

William Amayo, "*Portfolio optimization and its effect on performance of banks in Kenya"*, United States International University - Africa, 2018

Wubitu Elias (2012), *"Factors Determining Commercial Bank Deposit: An Empirical Study on Commercial Bank of Ethiopia"*. MBA Thesis Submitted to Addis Ababa University.

Xuezhi Qin & Dickson Pastory (2012), *"Commercial Banks Profitability Position: The Case of Tanzania",*International Journal of Business &Management; 7(13), PP. 136-144, doi:10.5539/ijbm.v7n13p136.

Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2013),*"Business research methods"* (9th edition), Mason, OH: South-Western.

Annex1 Diagnostic tests Detail output

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.583248	Prob. F(2,75)	0.5606
Obs*R-squared	1.286466	Prob. Chi-Square(2)	0.5256

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 10/28/20 Time: 10:54
Sample: 1 85
Included observations: 84
Presample and interior missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAR	0.001088	0.009842	0.110500	0.9123
LIQ	-0.002839	0.013898	-0.204257	0.8387
LPR	-0.009041	0.072860	-0.124087	0.9016
LOGD	-0.000428	0.003109	-0.137659	0.8909
CAR	-0.003566	0.027741	-0.128541	0.8981
LGR	-0.000405	0.003200	-0.126624	0.8996
C	0.002179	0.019978	0.109053	0.9135
RESID(-1)	0.145541	0.125783	1.157083	0.2509
RESID(-2)	0.001707	0.125027	0.013657	0.9891

R-squared	0.015315	Mean dependent var	1.75E-17
Adjusted R-squared	-0.089718	S.D. dependent var	0.005208
S.E. of regression	0.005437	Akaike info criterion	-7.490399
Sum squared resid	0.002217	Schwarz criterion	-7.229954
Log likelihood	323.5968	Hannan-Quinn criter.	-7.385702
F-statistic	0.145812	Durbin-Watson stat	1.961360
Prob(F-statistic)	0.996610		

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.507623	Prob. F(6,77)	0.1869
Obs*R-squared	8.830677	Prob. Chi-Square(6)	0.1833
Scaled explained SS	6.523733	Prob. Chi-Square(6)	0.3671

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 10/28/20 Time: 10:55
Sample: 1 85
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.01E-05	0.000128	-0.234917	0.8149
LAR	-9.41E-05	6.23E-05	-1.510753	0.1349
LIQ	2.69E-05	8.82E-05	0.304416	0.7616
LPR	-0.000328	0.000468	-0.701724	0.4850
LOGD	1.43E-05	1.98E-05	0.721420	0.4728
CAR	0.000295	0.000176	1.680462	0.0969
LGR	-1.15E-06	2.05E-05	-0.056003	0.9555

R-squared	0.105127	Mean dependent var	2.68E-05
Adjusted R-squared	0.035397	S.D. dependent var	3.58E-05
S.E. of regression	3.51E-05	Akaike info criterion	-17.59640
Sum squared resid	9.49E-08	Schwarz criterion	-17.39383
Log likelihood	746.0489	Hannan-Quinn criter.	-17.51497
F-statistic	1.507623	Durbin-Watson stat	1.810206
Prob(F-statistic)	0.186879		

Ramsey RESET Test
Equation: UNTITLED
Specification: ROALARLIQLPRLOGDCARLGR C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.593056	76	0.1153
F-statistic	2.537827	(1, 76)	0.1153
Likelihood ratio	2.759152	1	0.0967

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	7.27E-05	1	7.27E-05
Restricted SSR	0.002251	77	2.92E-05
Unrestricted SSR	0.002178	76	2.87E-05

LR test summary:

	Value	df
Restricted LogL	322.9485	77
Unrestricted LogL	324.3281	76

Unrestricted Test Equation:
Dependent Variable: ROA
Method: Least Squares
Date: 10/28/20 Time: 10:56
Sample: 1 85
Included observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAR	-0.009684	0.012239	-0.791265	0.4313
LIQ	0.017889	0.013915	1.285572	0.2025
LPR	0.125607	0.076609	1.639597	0.1052
LOGD	0.003490	0.003236	1.078400	0.2843
CAR	0.169787	0.065129	2.606934	0.0110
LGR	-0.011446	0.005222	-2.191885	0.0315
C	-0.017452	0.021276	-0.820287	0.4146
FITTED^2	5.217803	3.275342	1.593056	0.1153

R-squared	0.824704	Mean dependent var	0.030993
Adjusted R-squared	0.808558	S.D. dependent var	0.012236
S.E. of regression	0.005354	Akaike info criterion	-7.531622
Sum squared resid	0.002178	Schwarz criterion	-7.300116
Log likelihood	324.3281	Hannan-Quinn criter.	-7.438558
F-statistic	51.07895	Durbin-Watson stat	1.799661
Prob(F-statistic)	0.000000		

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	7.725094	6	0.2589

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LAR	-0.010119	-0.013872	0.000360	0.8433
LIQ	0.020771	0.023970	0.000078	0.7168
LPR	0.099524	0.148836	0.001281	0.1683
LOGD	0.007229	0.005312	0.000014	0.6026
CAR	0.185656	0.241805	0.000747	0.0400
LGR	-0.016995	-0.017974	0.000001	0.3773

Cross-section random effects test equation:
Dependent Variable: ROA
Method: Panel Least Squares
Date: 10/28/20 Time: 10:59
Sample: 2015 2019
Periods included: 5
Cross-sections included: 17
Total panel (unbalanced) observations: 84

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.031633	0.020947	-1.510176	0.1362
LAR	-0.010119	0.022238	-0.455031	0.6507
LIQ	0.020771	0.015492	1.340746	0.1850
LPR	0.099524	0.074704	1.332240	0.1877
LOGD	0.007229	0.004825	1.498064	0.1393
CAR	0.185656	0.041091	4.518140	0.0000
LGR	-0.016995	0.003079	-5.520414	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.898906	Mean dependent var	0.030993
Adjusted R-squared	0.862447	S.D. dependent var	0.012236
S.E. of regression	0.004538	Akaike info criterion	-7.724909
Sum squared resid	0.001256	Schwarz criterion	-7.059328
Log likelihood	347.4462	Hannan-Quinn criter.	-7.457351
F-statistic	24.65462	Durbin-Watson stat	2.297107
Prob(F-statistic)	0.000000		