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The Determinants of Financial Performance of Commercial
Banks in Ethiopia

A Thesis Submitted to the School of Graduate Studies of Addis Ababa
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Financial Services

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Declaration

I, the undersigned, declare that this thesis is my original work and has not been presented or submitted partially or in full by any other person for a degree in any other university, and that all sources of materials used for the purpose of this thesis have been duly acknowledged.

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Abstract

This study attempts to extensively investigate the determinants of financial performance of state owned and private-owned commercial banks in Ethiopia . The author has chosen one of the most popular methods for measuring banking performance, the CAMELS model approach, which is an acronym for the terms, Capital adequacy, Asset quality, Management quality, Earnings ability, Liquidity and Sensitivity to Market risk. The study used quantitative research approach and secondary financial data are analyzed by using multiple linear regression models. Fixed effect regression model was employed on a panel data obtained from audited financial statements of a sample 7 banks, which were selected using judgmental sampling technique, from 2004-2016 to investigate the impact & relationship of internal (bank specific) and external (macroeconomic) factors with bank profitability measure of ROA. The internal factors used in this study include Capital adequacy; Asset Quality, Management Quality, Earning ability & Liquidity Management, whereas the external factors are real GDP and Inflation. Moreover, Based on the regression result, all internal (endogenous) variables except Liquidity affect performance of the bank at 1% and 5% significance level and from external (exogenous) variables Inflation have significant effect on the performance of banks at 5% significance level. However, Real Gross Domestic Product (RGDP) have insignificant effect on financial performance of commercial banks in Ethiopia. Eventually, the study is attentive in its evaluation process pursuing meaningful analysis that clearly identifies the Ethiopian banking sector strengths and challenges in all financial and managerial areas.

Keywords: *Ethiopian Banks, Financial Performance, Profitability, CAMELS Model*

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List of Acronyms

AIB: Awash International Bank

AQ: Asset Quality

BCBS: Basel Committee on Banking Supervisions

BIS: Bank for International Settlements

BLUE: Best Linear Unbiased

Estimator **BOA:** Bank of Abyssinia

CAMEL: Capital adequacy, Asset Quality, Management quality, Earning quality, Liquidity

CAR: Capital Adequacy Ratio

Bank **CBE:** Commercial Bank of

Ethiopia **CC:** Correlation Coefficient

CI: Condition Index

CLRM: Classical Linear Regression Model

CSA: Central Statistical Agenc

DB: Dashed Bank

DW: Durbin-

Watson **EA:**

Earning Ability

FEM: Fixed Effect Model

JB: Jarque-Bera

LIB: Lion International Bank

LM: Liquidity Management

LPR: Loan Provision to Total Loan Ratio

MoFED: Ministry of Finance and Economic Development

MQ: Management Quality

NBE: National Bank of Ethiopia

NIB: Nib International Bank

NIM: Net Interest Margin

NPL: Non-performing loans

OECD: Organization of Economic Countries and Development

OLS: Ordinary Least Square

REM: Random Effect Model

ROA: Return on Assets

ROE: Return on Equity

RWA: Risk Weighted Assets

SIZE: Bank size

UB: United Bank

VaR: Value at risk

WB: Wogagen Bank

CHAPTER ONE

INTRODUCTION

1.1 Back ground of the study

The banking sector occupies a very important position in the country's economy, acting as an intermediary to all industries, ranging from agriculture, construction, textile, manufacturing, and so on. The banking industry thus contributes directly to national income and its overall growth (Dash & Das, 2009) and although the banking sector is the backbone of any economy and this gains more importance for a country (Chandani *et al.*, 2014). As the banking sector has a major impact on the economy as a whole, evaluation, analysis, and monitoring of its performance is very important (Dash & Das, 2009).

Generally, the financial performance of banks and other financial institutions has been measured using a combination of financial ratios analysis, benchmarking, measuring performance against budget or a mix of these methodologies (Avkiran, 1995).

In recent years one of the most used models for the estimation of a bank performances and soundness is represented by the CAMELS framework (Roman & Sargu, 2013). Actually, the analytical framework is based on the CAMELS rating system, a device created by federal banking regulators to assess the overall performance of banks (Rose & Hudgins, 2010). The CAMELS framework involves the consideration of six major factors (Doumpos & Zopounidis, 2010). The CAMEL acronym stands for Capital adequacy, Asset quality, Management, Earning and Liquidity. Regulators created an additional measure, Sensitivity, to evaluate market risk associated with changing interest rates and other factors (H. Hays *et al.*, 2009) especially in the financial crisis (Kandrac, 2014).

CAMELS rating are calculated in order to show financial performance of the banks in different respects (Oztorul, 2011). This system is a natural object of analysis, as it is not only a widespread supervisory tool, but also one of the few generally accepted quantifiers of the otherwise soft notion

of bank safety (Derviz & Podpiera, 2008). CAMELS ratio model is very suitable and accurate to be used as a performance evaluator banking industries and to predict the failure rate (Salhuteru & Wattimena, 2015).

1.2 The Overview of Ethiopian Banking System

Bank of Abyssinia was the first bank established in Ethiopia based on the agreement between Ethiopian government and National bank of Egypt in 1905 with a capital of 1 million shillings. However, bank of Abyssinia was closed at in 1932 by Ethiopian government under Emperor Haile Selassie and replaced by Bank of Ethiopia with a capital of pound sterling 750,000. Following the Italian occupation between 1936-1941, the operation of bank of Ethiopia ceased whereas the departure of Italian and restoration of Emperor Haile Selassie's government established the state bank of Ethiopia in 1943. However, State bank of Ethiopia was separated into National bank of Ethiopia and commercial bank of Ethiopia S.C. to separate the responsibility of national bank from commercial banks in 1963. Then, on December 16, 1963 as per proclamation No.207/1955 of October 1963 commercial bank of Ethiopia control all commercial banking activities (Fasil and Merhatbeb, 2009).

Following the declaration of socialism in 1974, the government extends the extent of its control over the whole economy and nationalized all large corporations. Accordingly, Addis bank and commercial bank of Ethiopia share company were merged by proclamation No.84 Of August 2, 12 1980 to form single commercial bank in the country until the establishment of private commercial banks in 1994. To this end, financial sector were left with three major banks namely; National bank of Ethiopia, commercial bank of Ethiopia and Agricultural and development bank during the socialist government. However, following the departure of Dergue regime, Monetary and Banking proclamation of 1994 established the National bank of Ethiopia as a legal entity. Following this, Monetary and Banking proclamation No.84/1994 and the Licensing and Supervision of banking business proclamation No.84/1994 laid down the legal basis for Investment in banking sectors (Habtamu, 2012). Currently, banking sectors in Ethiopia are showing progressive developments in terms of number of branches, total assets, human resource utilization and the like relative to other African developing countries. This indicates as Ethiopia categorized under banked country with limited outreach (Tseganesh, 2012).

1.3 Statement of the Problem

A number of studies have examined the determinants of banks' performance in many countries around the world. For instance, (Nassreddine, et al , 2013) for Tunisian banks, (Okoth,V & Gemechu,B, 2013) for Kenyan banks, (Ezra, 2013) for SSA banks, (Tan & Floros, 2012)for China banks, (Sarita, et al, 2012) for Indonesian banks, (Dietrich & Wanzenried, 2009)for Switzerland banks, (Sufian F., 2011)for Korean banks, (Sufian & Shah, 2009) for Bangladesh banks and others undertook studies on financial performance of bank. Even though, all these and other researchers conducted study on this area, the determinants of financial performance have been debated for many years and still unsolved issues in the corporate finance literature. Indeed what makes the financial performance determinants debate exciting is the determinants are dynamic through time to time and differ with the nature of operating of the firm from place to place (Flamini, et al, 2009).

Studies show, there are no universally accepted findings on what determines financial performance of the banking sector, because countries vary each other in their economic systems, financial systems, political systems and operating environments.

Specifically in Ethiopia the banking sector is unstudied area, though, few studies have been conducted on financial performance of Ethiopian commercial banks. For instance, study conducted on financial performance and ownership structure of Ethiopian commercial banks (Deepak and Abebaw, 2011) indicated that, even if, after 1994 financial liberalization the numbers of banks in the industry (particularly private banks) are increased and the performance progress of the sector is better than the past. Recent data testifies that mostly the banking sector has experienced a trend of growing profitability alongside positive trends related to balance sheet expansion (NBE Report 2011/12). However, the contributing factors, whether internal or external, to the greatest profitability earned by the industry was not well analyzed. It is important therefore, to understand if the banking sector profitability is being driven by factors related to the bank or are from external sources or both. This raises some important issues: To what extent endogenous factors impact the performance of banks? Do external factors impact the financial performance of commercial banks in Ethiopia? This will be helpful to identify the reason for the success of some commercial banks among the group and helps to identify the determinants for better performance of

the Ethiopian banks.

This study, hence basically intends to systematically identify and measure both internal and external factors that impact the performance of the Ethiopian banking sector using data from 2005-2016. The study has different perspectives than the usually observed performance measures applied in most studies done in Ethiopia and other countries. The gaps in literature this study tried to incorporate include:

- The research works done in Ethiopia do not incorporate the impact of the foreign currency position or the fx rate variation and market concentration in the performance of banks. Unlike other countries the Ethiopian banks earn significant sum of income from their international banking activities which totally relies on the currency level, the Fx- rate variation, currency position and the currency management practice of the banks.
- Most of the research works done in Ethiopia also do not incorporate the impact of Market concentration on the performance of banks. Banks in more concentrated markets are most likely to make “abnormal profits” by their ability to lower deposits rates and to charge higher loan rates as a results of collusive (explicit or tacit) or monopolistic reasons, than firms operating in less concentrated markets, irrespective of their efficiency (Tregenna, 2009). The Relative Market Power (RMP) hypothesis posits that bank profitability is influenced by market share. It assumes that only large banks with differentiated products can influence prices and increase profits. They are able to exercise market power and earn non-competitive profits.
- This study will also contribute to the literature by empirically re-confirming (or otherwise) the results of the previous studies on The Determinants of Financial Performance of Commercial Banks, especially with regard to Ethiopia’s situation using ROA as performance measure.

This is therefore the aim of this study is to fill the above gap and to find out the relationship between bank specific factors (CAMEL factors) on the banks' performance and to realize which variables have highly significant contribution for the bank performance. The study will systematically check the determinants of financial performance of banks with the regulator standard settings of each factors of the CAMEL model using data from 2006-2016. This study will also contribute to the literature by empirically re-confirming (or otherwise) the results of the previous studies, especially with regard to Ethiopia's situation using ROA as performance measure.

1.4 Research Question

1. To what extent do endogenous factors (Bank Specific Internal Factors) affect the financial performance of Commercial Banks in Ethiopia?
2. To what extent do Macro Economic factors (Economic growth and Inflation) affect the financial performance of Commercial Banks in Ethiopia?

1.5 Objectives of the Study

1.5.1 General Objectives

The main purpose of this study is to analyze the effect of bank specific (internal) and macroeconomic (external) factors on the financial performance of commercial Banks in Ethiopia.

1.5.2 Specific Objectives

With a view to achieve the above general objective, the study has the following specific objectives:

- To analyze the effect Capital Adequacy on the financial performance of Commercial Banks in Ethiopia.
- To examine the effect Asset Quality on the financial performance of Commercial

Banks in Ethiopia.

- To evaluate the effect Management Quality on the financial performance of Commercial Banks in Ethiopia.
 - To analyze the effect Earning Ability on the financial performance of Commercial Banks in Ethiopia.
- To examine the effect Liquidity Management on the financial performance of Commercial Banks in Ethiopia.
- To examine the effect economic growth on the financial performance of Commercial Banks in Ethiopia.
- To examine the effect Inflation on the financial performance of Commercial Banks in Ethiopia.

1.6 Hypothesis of the Study

The study has developed the following hypotheses based on existing theory and empirical studies related to factors affecting the performance of Commercial Banks in Ethiopia.

- H1: There is a positive and significant relationship between capital adequacy ratios and performance of the banks.
- H2: There is a negative and significant relationship between asset quality ratios and performance of the banks.
- H3: There is a negative and significant relationship between management efficiency ratios and performance of the banks.
- H4: There is a positive and significant relationship between earnings ratios and performance of the banks.
- H5: There is a positive and significant relationship between liquidity ratios and performance of the banks.
- H6: There is a positive and significant relationship between economic growth rate and performance of the banks.
- H7: There is a negative and significant relationship between Inflation rate and performance of the banks.

1.7 Significance of the Study

The study has sought out the Determinates of financial performance in Ethiopian commercial banks. Knowledge of such determinant factors have both theoretical /research as well as practical significance. The theoretical /research related significance relates to further validation of some of the factors identified as determinants of financial performance based on empirical data from Ethiopia. In specific terms, the following are the significances that this study has achieved.

- The study will help to analyze the concept of the Camel model approach and to know which variables have significant contribution to financial performance measure of Commercial Banks in Ethiopia.
- The study will help all parties including depositors, investors, bank managers and regulators and future researchers on the topic. For depositors to withdraw or deposit their money, For Investor to evaluate the performance of the bank while they are investing as well as post investment return, For Bank Manager to ensure their risk levels are not too high, and to take action if they are and to investigate the banks weakness and strength, regulators for identifying banks requiring special supervisory attention or concern. And For researcher for validation of some of the factors affecting the financial performance of Commercial Banks.
- Moreover the study will help not only to know the overall performance and soundness of Commercial Banks in Ethiopia but also to give rank.
- The study will also indicate how our banks can respond the highly dynamism of the sector.
- For each bank as a guideline for the future trend of financial position.

1.8 Scope and Limitation of the study

1.8.1. Scope of the Study

This study employed secondary data consisting of annual report of Commercial banks i.e. one state owned commercial banks; namely Commercial Bank of Ethiopia (CBE) and 7 private commercial banks; namely DB,AIB, CBO, BOA, WB, UB and NIB which have at least the latest eleven years' experience.

1.8.2. Limitation of the Study

This analysis is based on only monetary information analysis of the non-monetary item is ignored. The analysis and its derived conclusion based on the secondary data source (i.e. mainly on published annual reports) and confidentiality of bank data is also a limitation of this study.

1.9 Organization of the study

This research report is organized into five chapters. Chapter one provides the general introduction about the whole report. Chapter two describes the review of related literature. Chapter three provide detail description of the methodology employed by the research. Chapter four provides the data description, analysis resultants, and its interpretation. Finally, chapter five presents the conclusion and recommendation.

CHAPTER TWO

Literature Review

2.1. Theoretical Literature Review

Commercial banks play a significant role in the economic growth of countries. Through their intermediation function banks play a vital role in the efficient allocation of resources of countries by mobilizing resources for productive activities. They transfer funds from those who don't have productive use of it to those with productive venture. In addition to resource allocation good bank performance rewards the shareholders with sufficient return for their investment. When there is return there shall be an investment which, in turn, brings about economic growth. On the other hand, poor banking performance has a negative repercussion on the economic growth and development. Poor performance can lead to runs, failures and crises. Banking crisis could entail financial crisis which in turn brings the economic meltdown as happened in USA in 2007 (Marshall, 2009.) That is why governments regulate the banking sector through their central banks to foster a sound and healthy banking system which avoid banking crisis and protect the depositors and the economy (Heffernan, 1996; Shekhar and Shekhar, 2007.) Thus, to avoid the crisis due attention was given to banking performance.

Normally, the financial performance of commercial banks and other financial institutions has been measured using a combination of financial ratios analysis, benchmarking, measuring performance against budget or a mix of these methodologies (Avkiran, 1995).

In many of the literature reviewed its explained that bank performance is represented mainly by quantifiable financial indicators. The literature on the determinants of bank performance has closely tied bank performance with profitability measures such as ROA, ROE and NIM. Smirlock (1985), Civelec and Al-Almi (1991), Agu (1992) and Chirwa (2001). Gilbert (1984) in a survey of literatures argued that bank profit is an appropriate measure of bank performance and criticize average interest rate and average service charge rates as poor measures of bank performance.

2.1.1 Bank Performance Indicators

- **Return on Asset (ROA)**

ROA is a major ratio that indicates the profitability of a bank. It is a ratio of Income to its total asset (Khrwish, 2011). It measures the ability of the bank management to generate income by utilizing company assets at their disposal. In other words, it shows how efficiently the resources of the company are used to generate the income. It further indicates the efficiency of the management of a company in generating net income from all the resources of the institution (Khrwish, 2011). Wen (2010), state that a higher ROA shows that the company is more efficient in using its resources.

- **Return on Equity (ROE)**

ROE is a financial ratio that refers to how much profit a company earned compared to the total amount of shareholder equity invested or found on the balance sheet. ROE is what the shareholders look in return for their investment. A business that has a high return on equity is more likely to be one that is capable of generating cash internally. Thus, the higher the ROE the better the company is in terms of profit generation. It is further explained by Khrwish (2011) that ROE is the ratio of Net Income after Taxes divided by Total Equity Capital. It represents the rate of return earned on the funds invested in the bank by its stockholders. ROE reflects how effectively a bank management is using shareholders' funds. Thus, it can be deduced from the above statement that the better the ROE the more effective the management in utilizing the shareholders capital.

- **Net Interest Margin (NIM)**

NIM is a measure of the difference between the interest income generated by banks and the amount of interest paid out to their lenders (for example, deposits), relative to the amount of their (interest- earning) assets. It is usually expressed as a percentage of what the financial institution earns on loans in a specific time period and other assets minus the interest paid on borrowed funds divided by the average amount of the assets on which it earned

income in that time period (the average earning assets). The NIM variable is defined as the net interest income divided by total earnings assets (Gul et al., 2011).

2.1.2 Determinants of Bank Performance

In most of the literatures, there are two way and sometimes three ways of classifying the determinants of bank performance. Al-Tamimi, 2010; Aburime, 2005, for instance classified the determinant factors in to two: bank specific (internal) and macroeconomic variables. The internal factors are individual bank characteristics which affect the bank's performance.

These factors are basically influenced by the internal decisions of management and board. The external factors are sector wide or country wide factors which are beyond the control of the company and affect the profitability of banks.

Other studies, Ongore, 2011, attempted to integrate sector specific factors like bank ownership bank size and concentration as a specific determinant of bank performance. This approach seems to segregate the external factor determinants in to sector specific and macroeconomic variable. However, some authors, (Chantapong, 2005; Olweny and Shiphoo, 2011) focused on sector specific variables with total neglect ion of the macroeconomic variables like GDP and inflation. In general the two approaches seem similar in context and wide variation is not observed in classifying the determinants of bank performance and most of the researchers used both internal and external variables in their studies.

Internal determinants of bank performance can be defined as factors that are influenced by a bank's management decisions. More precisely, the internal factors are bank specific variables which influence the profitability of specific bank, (Al-Tamimi, 2010; Aburime, 2005). Even if there is variation in the number of determinant factors pointed out by the number of studies, the variables can be summarized using the CAMEL framework to proxy the bank specific factors as done in the study of Dang, 2011. CAMEL stands for Capital Adequacy, Asset Quality, Management Efficiency, Earnings ability and Liquidity. Each of these indicators is described below:

- **Capital Adequacy**

The NBE has set specific measure of the capital adequacy position of Banks, which is the ratio the Capital Adequacy Ratio (CAR) (Directive No. SBB/9/95). The directive clearly set out

the computation mechanism and the conversion factors for both on and off-balance sheet items and strictly set for all banks not to maintain their capital level below 8% of their risk weighted assets. Regardless of such regulatory framework, the major intention of holding capital is to build the internal strength of the bank to withstand losses during crisis (Dang (2011)). However some authors argue that capital also affects performance via creating liquidity, hence banks with strong capital position are able to reduce their financing costs, for example by paying low interest rates on their debt (Diamond, 2000). However, holding high capital level is not without drawbacks: a higher CAR ratio reduces the ROE due to two mechanisms: A high ratio indicates a lower risk, and the theory of markets to balance advocating a strong relationship at risk and profitability would lead us to infer a lower profitability. To gauge the capital adequacy, bank supervisors currently use the capital-risk asset ratio. The adequacy of capital is examined based upon the two most important measures such as Capital Adequacy Ratio (CAR) or Capital to Risk-weighted Assets ratio, and the ratio of capital to assets.

The capital adequacy is estimated based upon the following key financial ratios

Table 2.1 Capital Ratios Analysis

Ratios	Formula
CAR	$\frac{\text{Tier 1 Capital} + \text{Tier 2 Capital}}{\text{Risk-Weighted Asset}}$
Equity capital to total assets	$\frac{\text{Total Capital}}{\text{Total Asset}}$
Leverage Ratio	$\frac{\text{DEBT}}{\text{Total Shareholders' Equity}}$

- **Asset Quality**

The asset side of a Bank's balance sheet is another bank specific variable that affects the profitability of a bank. Even if the total package of the Bank's asset consist of various asset components such as cash, deposit with banks including reserves at the NBE, loans, investments, fixed assets etc, there seems an agreement to focus on the quality of the loan portfolio. This seems due to the large size of loans in the Banks balance sheet which mainly emanated from the inherited intermediation activity of banks. In addition, more often bank loan of a bank is the major asset that generates the major share of the banks income. Hence the quality of loan portfolio determines the profitability of banks. The highest risk facing a bank is the losses derived from

delinquent loans and it's highly affects the performance of Banks (Dang, 2011). Liu and Wilson

(2010) find that a deterioration of the credit quality reduces the ROA and ROE. The asset quality is estimated based upon the following key financial ratios,

Table 2.2 Asset Quality Ratios Analysis

Ratios	Formula
NPLs to total loans	$\frac{\text{NPLs}}{\text{Total loans}}$
NPLs to total equity	$\frac{\text{NPLs}}{\text{Total Equity}}$
Allowance for loan loss ratio	$\frac{\text{Allowance for loan loss}}{\text{Total loans}}$

- **Management Efficiency**

Management Efficiency is one of the key internal factors that determine the bank profitability but appears to be one of the complexes subject to capture with financial ratios (Ongore 2013). However, different authors try to use financial ratios of the financial statements to act as a proxy for management efficiency. One of these ratios used to measure management quality is operating profit to income ratio (Rahman et al. 2009; Sangmi and Nazir,

2010). However, some used the ratio of costs to total assets (Nassreddine, 2013). In

whatever way the argument goes measuring the management efficiency requires to get deep into evaluation of the management systems, organizational discipline, control systems, quality of staff, and others. In the Ethiopian context the regulatory organ considers all the aforesaid variables. Hence, a single quantitative measure of the management performance is not set. Management Quality can be measured by the following ratios:

Table 2.3 Management Quality Ratios Analysis

Ratios	Formula
Cost to income	$\frac{\text{Cost}}{\text{Income}}$
Operating Cost to Net Operating Income	$\frac{\text{Operating Cost}}{\text{Net Operating Income}}$

• **Earning Ability**

Earning ability indicate the ability of the banks in generating revenue by using the asset, shareholders equity and using the proportion of gross income. To assess the earnings performance of a bank, it will be helpful to look at a variety of ratios and measures: these include: (1) return on assets (ROA) (2) return on equity (ROE) and profit margin (PM).

There are requirements that are used as to evaluate Earning like:

- Majority of earnings is annuity in nature (low volatility).
- The growth trend of the past years is consistent with or better than industry norm and there are multiple sources of income (both interest and non-interest income).

The profitability is estimated based upon the following key financial ratios,

Table 2.4 Earning ability Ratios Analysis

Ratios	Formula
Net interest income	$\frac{\text{Net Interest Income}}{\text{Total Loan \& Advance}}$
Return on asset (ROA)	$\frac{\text{Net Interest Income}}{\text{Total asset}}$
Return on equity (ROE)	$\frac{\text{Net Interest Income}}{\text{Shareholder's Equity}}$

• **Liquidity**

Liquidity indicates the ability of the bank to meet its financial obligations in a timely and effective manner. There are variations among scholars with regard to the measurement ratios. The most common financial ratios that reflect the liquidity position of a bank according to Samad (2004) are customer deposit to total asset and total loan to customer deposits. Other scholars use different financial ratio to measure liquidity. For instance Ilhomovich (2009) used cash to deposit ratio to measure the liquidity level of banks in Malaysia.

In the Ethiopian context there seems clear measure of the liquidity: the liquid asset to deposit ratio, which the National Bank of Ethiopia, has set the minimum liquid asset of the Bank not to be less than 15% of the Bank's net current liability. Out of this the directive obliged banks to hold 5% of them in primary reserve assets (see directive no SBB 55/2013).

The liquidity requirements are taken into Bank Analysis as below:

- Majority of the funding is coming from customer's deposits, and no concentration of funding sources.
- Is there a maturity or interest rate mismatch?
- Does the central bank impose reserve requirements?

The Liquidity is estimated based upon the following key financial ratios,

Table 2.5 Liquidity Ratios Analysis

Ratios	Formula
Customer deposits to total assets	$\frac{\text{Total Customer Deposit}}{\text{Total Assets}}$
Total loan to customer deposits (LTD)	$\frac{\text{Total Loan}}{\text{Total Customer Deposit}}$

2.2 Empirical Literature Review

In recent decades the CAMEL model has been used by academics scholars and administrators to analyze financial performance of banks; both public and private banks. The empirical review of this study is done by identifying similarities and differences across the various economies studied by previous researchers and a summary of some of these studies are given below:

Ongore and Kusa (2013) studies determinants of financial performance in Kenya banks, the authors used linear multiple regression model and Generalized Least Square on panel data to estimate the parameters. The findings showed that bank specific factors significantly affect the performance of commercial banks in Kenya, except for liquidity variable. **Olweny and Shipho (2011)** evaluated the effects of banking sectoral-factors on the profitability of commercial banks in Kenya, using panel data from 2002 to 2008 of 38 commercial banks. The authors concluded that the bank-specific factors are more significant factors influencing the profitability of commercial banks in Kenya than market factors. The study revealed that profitable commercial banks are those that strive to improve their capital bases, reduce operational costs, improve assets quality by reducing the rate of non-performing loans, employ revenue diversification strategies as opposed to

focused strategies and keep the right amount of liquid assets. And also **Khrawish (2011)** accessed the Jordanian commercial bank profitability from 2000 through 2010, and categorized the factors affecting profitability into internal and external factors. The author found that there is significant and positive relationship between return on asset (ROA) and the bank size, total

liabilities/ total assets, total equity/ total assets, net interest margin and exchange rate of the commercial banks. In addition **Lelisa** (2014) investigates the determinants of Ethiopian banks performance considering bank specific and external variables on selected banks' profitability for the 1990-2012 periods. The empirical investigation uses the accounting measure Return on Assets (ROA) to represent Banks' performance. The study finds that bank specific variables by large explain the variation in profitability. The result is consistent with the results of **Ongore & Kusa** (2013), **Olweny & Shipo** (2011) and **Khrawish** (2011) which are discussed above. In addition, the paper of **Lelisa** (2014) finds that bank's capital and liquidity status are not significant to affect the performance of banks. On the other hand, the paper finds that bank size and macro-economic variables such real GDP growth rates have no significant impact on banks' profitability. However, the inflation rate is determined to be significant driver to the performance of the Ethiopian commercial banks. Moreover, **Dawit** (2016) examine the financial Performance of Commercial Banks in Ethiopia and used random effect regression model on the panel data over the period 2002-2014 and conclude that among internal determinant factors asset quality, earnings ability and Bank size have a significant influence on the financial performance of Ethiopian Commercial Banks when measured by ROA, ROE and NIM. **Macit** (2011) investigated the bank specific and macroeconomic determinants of profitability in participation banks for Turkish banking sector using ROA and ROE. He found that for the bank specific determinants of profitability, the ratio of non-performing loans to total loans has a significant negative effect on profitability. The result is consistent with the study by **Davydenko** (2010) in the Ukraine and the study by **Dawit** (2016) in the Ethiopia. **Macit** (2011) also found that the log of real assets has a significant positive effect on profitability. **Riaz** (2013) investigated the impact of the bank specific variables and macroeconomic indicators on the profitability of banks in Pakistan during the period of 2006-2010. When ROA is taken as a dependent variable, he determined that the credit risk as well as the interest rate has a significant influence on the commercial banks' profitability in Pakistan.

Moreover, **Mekonnen et al** (2015) tested soundness of Ethiopian banking Industry using Camel frame work and takes secondary data from audited financial reports and their result shows

CAMEL framework is the best fit measurement for Ethiopian Banks and it give a

comprehensive result which is very helpful for the governor to set a well determined policy and procedure. **Sarker** (2005) scrutinized the CAMEL model for regulation and supervision of Islamic banks by the central bank in Bangladesh. The study enabled regulators and supervisors to get a Shariah benchmark to supervise and inspect Islamic banks and financial institutions from an Islamic perspective. Along with the Camel model. **Cole et al.** (1998) conducted a study on “A CAMEL Rating's Shelf Life” and the findings suggest that if a bank had not been examined for more than two quarters, off-site monitoring systems usually provide a more accurate indication of survivability than its CAMEL rating. **Suvita and Xiaofeng** (2012) conducted a case study on a comparison of financial performance of different ownership structured Commercial Banks in Nepal based on Camel Model. Eighteen commercial banks for the period 2005 to 2010 were financially analyzed. In addition, econometric model (multivariate regression analysis) by formulating two regression models was used to estimate the impact of capital adequacy ratio, non-performing loan ratio, interest expenses to total loan, net interest margin ratio and credit to deposit ratio on the financial profitability namely return on assets and return on equity of these banks. The results show that public sector banks are significantly less efficient than their counterpart are; however domestic private banks are equally efficient to foreign-owned (joint- venture) banks. Furthermore, the estimation results reveal that return on assets was significantly influenced by capital adequacy ratio, interest expenses to total loan and net interest margin, while capital adequacy ratio had considerable effect on return on equity. **Malihe Rostami** (2012) presents study on the title “Camels Analysis on Banking Industry” In this study some important ratios are chosen and calculated to evaluate bank's performance. Data which is used in this study is gathered from annual financial reports of an Iranian bank. Then data is compared with other bank's ratios and reports. Certainly, the trends of calculations and relevant figures show important points for managers and also, CAMELS rating can be an efficient tool to manage and control and decide in management accounting view. **Golam Mohuddin** (2014) analyzed the financial performance of Banks in Bagladesh by using Camel Model. In this study, an effort has been made to evaluate the financial performance of the two major banks (one is NCB and another one is PCB) operating in Bangladesh. This evaluation has been done by using CAMEL Parameters, the latest model of financial analysis. Through this model, it is highlighted that the position of the banks under the study is sound and satisfactory so far as their capital adequacy, asset quality, management

capability and liquidity is concerned. **Morteza et al (2013)** conducted a study on evaluating financial performance of public and private Banks in Iran. The results show that there is a significant difference between private and public banks in terms of liquidity and earning performance and management quality. In terms of liquidity and earning performance the private banks have better performance but the public banks have better performance in terms of management performance. The result is similar with the study by **Mekonnen et al. (2014) in Ethiopia.**

Athanasoglou et al. (2005) studied the effect of bank-specific, industry-specific and macroeconomic determinants of bank profitability, using an empirical framework that incorporates the traditional Structure-Conduct-Performance (SCP) hypothesis. The results indicated that all bank-specific determinants, with the exception of size, affect bank profitability significantly in the anticipated way. Saona (2011) examined the determinants of the profitability of the US banks during the period 1995-

2007. The empirical analysis combined bank specific (endogenous) and Macroeconomic (exogenous) variables through the GMM system estimator. He found a negative link between the capital ratio and the profitability, which supports the notion that banks are operating over-cautiously and ignoring potentially profitable trading opportunities. Scott and Arias (2011) also investigated the primary determinants of profitability of the top five bank holding companies in the United States. The findings of Scott and Arias (2011), which were also highlighted by Rahman and Farah (2012), show that profitability determinants for the banking industry include capital to asset ratio, annual percentage changes in the external per capita income and internal factor of size (as measured by an organization's total assets). Staikouras and Wood (2004) constructed the OLS and fixed effect models to examine the determinants of European bank profitability from 1994 – 1998. The authors found that the profitability of European banks is influenced not only by factors related to their management decisions but also to changes in the external macroeconomic environment.

Flamini, McDonald and Schumacher (2009) investigated the determinants of bank profitability in 41

Sub-Saharan African (SSA) countries, using a sample of 389 banks. The study proved that apart from credit risk, higher returns on assets are associated with larger bank size, activity diversification, and private ownership. The results also indicate that bank returns are

affected by macroeconomic variables, suggesting that macroeconomic policies that promote low inflation and stable output growth do boost credit expansion. **Sharma and Gounder (2012)** investigated the profitability determinants of

deposit-taking institutions in Fiji, over the 2000–2010 periods. The study used panel data techniques of fixed effects estimation and generalized method of moments (GMM). The authors discovered that Market power (measured by the Lerner Index) is a key determinant of profitability. Thus, institutions were allowed to pass on to their clients the interest costs of raising deposit liabilities and the overall cost of operations. Naceur and Goaid (2008) observed a positive relationship between capital and net interest margin or profitability in Tunisia, but determined that the bank size impacts negatively on profitability, which implies that Tunisia banks are operating above their optimal level.

Furthermore, **Manel Hadriche et al (2015)** investigate determinants of Bank Performance which is a comparative analysis between Conventional and Islamic Banks in GCC Countries. Using a sample of 71 Conventional banks and 46 Islamic banks that operate inside GCC countries for the period

2005-2012 and by using CAMEL test, they find that comparing the profitability of the Islamic and Conventional banks shows that for all the ratios used to measure profitability, Islamic banks are on- average more profitable than the Conventional ones. For performance determinants, results show that bank size affect performance of both Conventional and Islamic banks. Operation cost has a positive and significant effect on performance in Conventional and Islamic banks. The coefficient of credit risk is negative and significant in Conventional banks and positive but insignificant in Islamic banks. Results show differences in regards to factors affecting performance between Conventional and Islamic banks. Specifically, credit risk does not affect Islamic bank performance, while inflation and GDP growth do not affect the performance of Conventional banks. **Malihe Rostami (2015)** analyzed determination of Camel model on Bank Performance. In this study the effects of each category of CAMELS are studied on performance. Q-Tobin's ratio is put as performance indicator. And also, data which is used in this study is gathered from annual financial reports of an Iranian bank and at the end, the model is extracted from analyses. With CAMELS studies, banks can focus on risk and some important ratios and try to manage and control some possible crisis.

Cole et al. (1995) conducted a study on “A CAMEL Ratings’ Shelf Life” and their findings suggest that, if a bank has not been examined for more than two quarters, off-site monitoring systems usually provide a more accurate indication of survivability than its CAMEL rating.

Godlewski (2003) tested the validity of the CAMEL rating typology for bank's default modelisation in emerging markets. He focused explicitly on using a logical model applied to a database of defaulted banks in emerging markets.

Said and Saucier (2003) examined the liquidity, solvency and efficiency of Japanese Banks using CAMEL rating methodology, for a representative sample of Japanese banks for the period

1993- 1999, they evaluated capital adequacy, assets and management quality, earnings ability and liquidity position.

Prasuna (2003) analyzed the performance of Indian banks by adopting the CAMEL Model. The performance of 65 banks was studied for the period 2003-04. The author concluded that the competition was tough and consumers benefited from better services quality, innovative products and better bargains.

Bhayani (2006) analyzed the performance of new private sector banks through the help of the CAMEL model. Four leading private sector banks – Industrial Credit & Investment Corporation of India, Housing Development Finance Corporation, Unit Trust of India and Industrial Development Bank of India - had been taken as a sample.

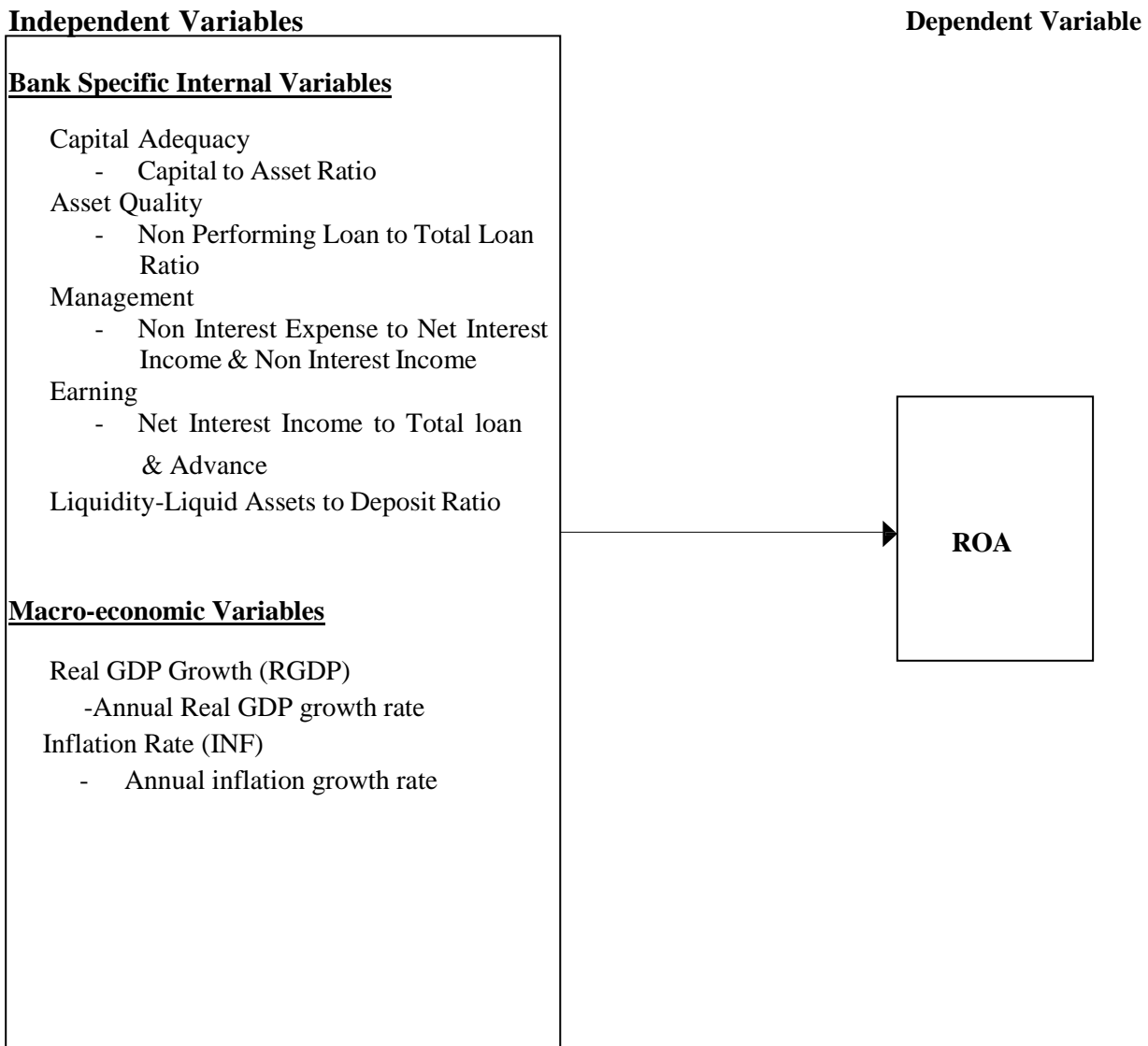
Gupta and Kaur (2008) conducted the study with the main objective to assess the performance of Indian Private Sector Banks on the basis of Camel Model and gave rating to top five and bottom five banks. They ranked 20 old and 10 new private sector banks on the basis of CAMEL model. They considered the financial data for the period of five years i.e., from 2003-07.

The literature reviewed above has shown the consistency of some of the CAMEL model factors, which are proxy for the internal (bank- specific) factors in determining bank profitability across different economies of the world. Consequently, the review shows that return on assets (ROA) and return on equity (ROE) are the most common criteria employed as measures of

profitability by most researchers. However, a search in the literature on the determinants of banks' profitability indicates that only insufficient empirical research, using few banks and/or economic variables, can be found in Ethiopia. Therefore, the study contributes to the literature by empirically re-confirming (or otherwise) the results of the previous studies, especially with regard to Ethiopia's situation using ROA as performance measure.

Figure 1 Conceptual Framework Independent and Dependent Variables

The conceptual framework is developed from the review of literature discussed above and presented in the following diagram (figure 1). It shows the relationship between the dependent(explained) (ROA) and Independent (explanatory) variables.



Source: Compiled by the researcher

CHAPTER THREE

Research Design and Methodology

This chapter discusses the research methodology employed to carry out this study. It starts by discussing the research design and proceeds with a discussion about the nature and instruments of data collection and sampling design.

3.1 Research Design and Approach

Research design is a master plan specifying the methods and procedures for collecting and analyzing the required data. The choice of research design depends on objectives that the researchers want to achieve (Hafiz, et al., 2007). As the main objective of the study is to check the health of selected commercial banks using a developed model known as CAMEL(s) Framework, Quantitative data has been used for evaluation.

Furthermore the nature of the study is primarily about evaluating performance of commercial banks in Ethiopia with the CAMEL model approach; which are dominantly quantitative data. Thus, the research employs quantitative research approach (Creswell, 2003). The research uses a panel data from 2005 to 2015.

3.2 Nature of Data and Instruments of Data collection

The data relevant to meet the objective has been collected from the audited annual reports of the selected commercial banks from the year 2005-2015. The main reason for using secondary data is the study aimed only to evaluate the performance of different banks using the CAMELS Framework which mainly demands data from published and audited financial reports. Panel data type is more convenient to compare the performances of the respective banks at a given point in time throughout the study years (Gujarati, 2004).

A secondary source of data, such as panel data, is chosen since it is less expensive in terms of time and money while collecting. It also offers an opportunity to collect high quality data (Saunders et al, 2009 as cited in Belay, 2012). Secondary data may either be published or unpublished data (Kothari, 2004). The panel data for this study is obtained from the audited annual financial statements of the concerned commercial banks in Ethiopia and various reports of NBE. These data includes only bank specific factors proxies by Camel model.

3.3 Sampling Design

Sample design deals with sample frame, sample size and sampling technique. Sampling is a technique of selecting a suitable sample for the purpose of determining parameters of the whole population. Population is the list of elements from which the sample may be drawn (Hafiz, et al., 2007). A sample is drawn to overcome the constraints of covering the entire population with the intent of generalizing the findings to the entire population. As of May 2015, there are eighteen banks in Ethiopia. These are commercial bank of Ethiopia (CBE), Awash international bank (AIB), Bank of Abyssinia (BOA), Wegagen bank (WB), United bank (UB), Nib international bank (NIB), Dashen bank (DB), Development bank of Ethiopia, Cooperative bank of Oromia, Lion international bank, Zemen bank, Oromia international bank, Buna international bank, Berhan international bank, Abay bank S.C, Addis international bank S.C, Dehub global bank S.C and Enat banks. However, from all the above listed banks, Development bank of Ethiopia is not Commercial bank (www.nbe.et).

As noted by Kothari (2004), good sample design must be viable in the context of time and funds available for the study. Besides, judgmental sampling offers the researcher to deliberately select items for the sample concerning the choice of items as supreme based on the selection criteria set by the researcher. Accordingly, this study employed purposive sampling technique to select the required sample of banks from the above listed banks since it is viable in line with time and funds available for this study.

The selection criteria set by the researcher was first, the required banks are only Commercial banks in Ethiopia. Second, those commercial banks should have started operation before 2004/05 so that they can have financial statements for more than a decade. Third, as of June 2015 the asset size of the government banks shared 68 % and which on average 249 billion birr and the banks grouped in private banks asset

size shared 28 % and which on average 104 billion birr .Therefore, based on the above selection criteria the data for this study was collected from seven commercial banks operating in the country which have 96% market share and on average 353 billion birr.

Out of the seven commercial banks, commercial bank of Ethiopia(CBE) is state owned banks whereas the remaining six banks: Dashen bank (DB), Awash international bank (AIB), Bank of Abyssinia(BOA), Wegagen bank(WB), United bank(UB), and Nib International bank (NIB) are private banks that were registered before 2004/05 by NBE.

Since the primary aim of this study is to evaluate the financial performance of commercial banks in Ethiopia with CAMELS model approach, it is good to consider sample banks which are much more experienced in the industry. Thus, the study used 13 years data of those seven selected commercial banks that provide financial statements consecutively from 2004-2016 periods.

3.4 Data Analysis and Presentation

As noted by Kothari (2004), data has to be analyzed in line with the purpose of the research. Accordingly, this study utilized descriptive, correlation and econometric analysis based on a panel data of commercial banks found in Ethiopia from 2005-2015 in order to evaluate the financial performance of commercial banks in Ethiopia with the bank specific internal factors with Camel model. Secondary data collected from NBE and head office of each respective bank were analyzed to determine its suitability, reliability, adequacy and accuracy. The data collected from different sources were coded, checked and entered to simple excel program to make the data ready for analysis. Then the collected data were processed and analyzed through E-view version 8 software packages.

For descriptive analysis; table and percentage were used to analyze the data. Besides, results of the descriptive statistics such as mean, standard deviation, minimum and maximum values were reported to describe the characteristics of variables under investigation.

Furthermore, various diagnostic tests such as Normality, Heteroscedasticity, Autocorrelation and Multicollinearity test were conducted to determine whether the data used for this study fulfill the assumption of classical linear regression model. Regression results were also presented in a tabular form with the appropriate test statistics and then an explanation of each parameter was given in line with the

evidence in the literature.

3.5 Variable Description and Research Hypotheses

This contain variable extracted from different literature for the purpose to see the impact of CAMELS framework on the performance of Ethiopian banks. Since 1988 the Basel Committee on Banking Supervision has stated that application of the CAMELS model is essential in order to evaluate financial institutions (Mahdian and Asadi Afshordi, 2014). CAMELS framework has six components, capital adequacy, Asset quality, management quality, Earning ability , Liquidity position and Sensitivity to market.

3.5.1 Dependent Variable

In the literature, there are two major alternatives measures of profitability, namely ROA and ROE.ROA reflects the ability of banks management to generate profits from the bank's assets, although it may be biased due to off-balance-sheet activites.ROE shows the return to shareholders on equity. The profitability measures included in the study **is Return on Asset (ROA)**

The ROA reflects the ability of a bank's management to generate profits from the bank's assets. It shows the profits earned per birr of assets and indicates how effectively the bank's assets are managed to generate revenues, although it might be biased due to off-balance-sheet activities. Average assets were used in this study, in order to capture any differences that occurred in assets during the fiscal year. ROA can be calculated as:

Return on Assets = Net after tax income/Total Assets

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

3.5.2 Independent Variable:

The major independent variables (determinants) or factors of the CAMELS model were capital adequacy, asset quality, Management efficiency , liquidity status and Sensitivity to Market which shall be proxies by bank specific(Internal) and macroeconomic(external) factors in relation to performance.

These variables can be measured by the following formulas:

- ❖ Capital adequacy: the study used gross capital to total asset ratio to measure Capital adequacy.

$$\text{Capital Adequacy (CA)} = \text{Gross Capital/Total Assets}$$

Gross capital include paid up capital, retained earnings and other reserves of banks

- ❖ Asset quality: the study measures by the ratio of Nonperforming loans to total loans.

$$\text{Asset Quality (AQ)} = \text{Non-performing loans/Total loans}$$

- ❖ Managerial Quality (MQ): the ratio of Non-interest expense to Net Interest income plus non-Interest Income.

$$\text{Management Quality (MQ)} = \frac{\text{Non-interest expenses}}{\text{Net interest income} + \text{non-interest income}}$$

- ❖ Earnings ability (EA): the study used the ratio of net interest income to total loans.

$$\text{Earning ability (EA)} = \frac{\text{Net interest income}}{\text{Total loans}}$$

- ❖ Liquidity Management (LM): the ratio of Liquid assets to total Deposits was used.

$$\text{Liquidity Management (LM)} = \frac{\text{Liquid Assets}}{\text{Total Deposits}}$$

- ❖ Real Gross Domestic Product (RGDP): The annual RGDP rate was used.

- ❖ Inflation Rate (INF): the annual inflation rate was used.

3.6 Operationalization of the Study Variable

This contain variable extracted from different literature for the purpose to see the impact of Bank specific internal and external factors on the performance of Ethiopian banks.

Table 3.1 Operationalization of the variables

Variable	Notation	Measurement	Used By (Source)	Expected Result
Dependent	ROA	Net Income to Total Asset	(Chan & Vong,2008)	
Independent	CA	Total Capital to Total Asset	(Ezra,2013)	+
	AQ	Non-performing loans to Total loans	(Habtamu,2012)	-
	MQ	Non-interest expense to net interest income	(Habtamu,2012)	-
	EA	Net interest income to Total loans	(Khrawish, 2013)	+
	LM	Liquid Assets to Total deposits	(Hadad, 2013)	+
	BS	Log of Total Assets	(Sufian & Shah, 2009)	+
	GDP	Annual Economic Growth	(Athanasoglou et al., 2005)	+
	INF	Annual Inflation Rate	(Athanasoglou et al., 2005)	-

Source: Compiled by the Researcher

3.7 Regression Model Specification

The nature of data used in this study enabled to use panel/longitudinal data model which is deemed to have advantages over cross sectional and time series data methodology. Panel data involves the pooling of observations on the cross-sectional over several time periods. As Brooks (2008) stated the advantages of using panel data set; first and perhaps most importantly, it can address a broader range of issues and tackle more complex problems with panel data than would be possible with pure time-series or pure cross-sectional data alone. Second, it is often of interest to examine how variables, or the relationships between them, change dynamically (over time).

To do this using pure time-series data would often require a long run of data simply to get a sufficient number of observations to be able to conduct any meaningful hypothesis tests. But by combining cross-sectional and time series data, one can increase the number of degrees of freedom, and thus the power of the test, by employing information on the dynamic behavior of a large number of entities at the same time. The additional variation introduced by combining the data in this way can also help to mitigate problems of Multicollinearity that may arise if time series are modeled individually.

Third, by structuring the model in an appropriate way, we can remove the impact of certain forms of omitted variables bias in regression results. Thus, the general panel/longitudinal regression is modeled as: $y_{it} = \beta_0 + \beta x_{it} + u_{it}$ with subscript i denoting the cross-section and t representing the time-series dimension. The left-hand variable y_{it} is the dependent variable, β_0 is the intercept term, β is a $k \times 1$ vector of parameters to be estimated on the explanatory variables, and x_{it} is a $1 \times k$ vector of observations on the explanatory variables, $t = 1, \dots, T$; $i = 1, \dots, N$.

Therefore, to test our hypothesis, the following model is formulated:

$$ROA_{it} = \beta_0 + \beta_1(CA)_{it} + \beta_2(AQ)_{it} + \beta_3(MQ)_{it} + \beta_4(EA)_{it} + \beta_5(LM)_{it} + \beta_4(RGDP)_t + \beta_5(INF)_t + \varepsilon_{it}$$

Where;

- β_0 is an intercept,
- $\beta_1, \beta_2, \beta_3, \beta_4, \text{ and } \beta_5$, represent estimated coefficient for specific bank i at time t ,

- **ROA_{it}**: The Return on asset ratio for banks i at time t.
- **CA_{it}** : The ratio of total capital to total assets for bank i at time t
- **AQ_{it}** : The ratio of Non-performing loans to total loans for bank i at time t.
- **MQ_{it}** : The ratio of Non-interest expense to net interest income plus interest income for bank i at time t.
- **EA_{it}** : Net interest margin (net interest income) to average earning asset for bank i at time t.
- **LM_{it}** : The ratio of Liquid assets to total deposit for banks i at time t.
- **RGDP_t**: The annual economic growth rate at time t.
- **INF_t** : The annual inflation rate at time t.
- **t**: Time (2005-2015).
- **ε_{it}**: Represents error terms for intentionally/unintentionally omitted or added variables. It has the characteristics of zero mean, constant variance and non- auto correlated.

The coefficients of explanatory variable were estimated by the use of ordinary least square (OLS) technique. The null hypothesis is to be rejected at 1%, 5% and 10% significant level.

Model Assumptions

The following diagnostic tests were carried out to ensure that the data suits the basic assumptions of classical linear regression model.

Normality: To check the normality, descriptive statistics was used. A normal distribution is not skewed and is defined to have a coefficient of kurtosis of (Brooks, 2008). One of the most commonly applied tests for normality; the Bera-Jarque formalizes these ideas by testing whether the coefficient of Skewness and the coefficient of excess kurtosis are zero and three respectively. (Brooks, 2008) Also states that, if the residuals are normally distributed, the histogram should be bell-shaped and the Bera-Jarque statistic would not be significant at 5% significant level.

Multicollinearity: There were different arguments towards the multicollinearity problem. (Gujarati D. N., 2004) Stated that multicollinearity problems exist when the correlation coefficient among variables greater than 0.75. (Cooper & Schendlar, 2003) Suggested that a correlation above 0.8 between explanatory variables should be corrected for. Lastly, (Hair JF, 2006) argued that also correlation coefficient below 0.9 may not cause serious multicollinearity problem. In contrary to this, (Kennedy, 2008) argued that as any correlation coefficient above 0.7 could cause a serious multi collinearity problem leading to inefficient estimation and less reliable results. A correlation matrix used to ensure the correlation.

Heteroscedasticity: According to (Brooks, 2008), Heteroscedasticity means that error terms do not have a constant variance. If heteroscedasticity occur, the estimators of the ordinary least square method are inefficient and hypothesis testing is no longer reliable or valid as it will underestimate the variances and standard errors. There are several tests to detect the Heteroscedasticity problem, which are Park Test, Glesjer Test, Breusch-Pagan-Goldfrey Test, White's Test and Autoregressive Conditional Heteroscedasticity (ARCH) test. In this case, this study chooses to use White test to detect Heteroscedasticity.

H_0 : There is no Heteroscedasticity problem in the model.

H_1 : There is Heteroscedasticity problem in the model.

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

Tests for Autocorrelation: Assumption that is made of the CLRM's disturbance terms is that the covariance between the error terms over time (or cross-sectional, for that type of data) is zero. In other words, it is assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are "auto correlated" or that they are "serially correlated". A test of this assumption is therefore required. To test the presence of autocorrelation, to test for autocorrelation the researcher apply Breusch-Godfrey Serial Correlation LM test.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1. Introduction

The study analyzes the impact of the selected internal & external variables in the profitability performance of the sampled commercial banks in Ethiopia. The variables tested in the study includes: the capital to asset ratio (Capital adequacy), Non-Performing loan to total loans (Asset quality), Non-Interest Expense to Net Interest Income plus non-interest income (Management Quality), net Interest Income to Average Earning Assets (Earning ability), liquid assets to deposit (Liquidity Management), GDP and Inflation. The estimate of the impact of the above mentioned internal & external variables on return to assets (ROA) of the sampled banks is also done.

4.2. Descriptive Statistics

Table 4.1 Summary of Descriptive Statistics

	ROA	CA	EA	AQ	INFLATIO N	LM	MQ	REAL_GDP
Mean	0.028596	0.126279	0.071136	0.079635	0.141465	0.444667	0.406840	0.108693
Median	0.029800	0.128250	0.061550	0.048539	0.102000	0.435000	0.396650	0.109000
Maximum	0.046800	0.198600	0.581200	0.535000	0.358900	0.782000	0.913800	0.135600
Minimum	0.003800	0.041200	0.021300	0.008600	0.017000	0.162100	0.160200	0.076000
Std. Dev.	0.008494	0.042798	0.058295	0.092898	0.095096	0.158706	0.108555	0.015569

Source: Eviews 8 Output

The study uses the following headings to interpret and discusses the findings:

- **Return on Assets,**
- **Capital Adequacy,**
- **Asset Quality,**

- **Management Quality,**
- **Earning ability,**
- **Liquidity Management,**
- **RGDP and**
- **Inflation.**
- **Return on Assets (ROA)**

The study uses return on asset ratio to measure how the performance of the bank is. The higher the ratio is the better soundness of the banking sector. It also indicates how well the average asset generates income. As shown on table 4.1 Ethiopian banking industry on average can generate 3% of the assets utilized. This implies all banks in Ethiopia on average earn 3 cents for each birr asset utilized. The industry can generate a maximum of 5% return of the asset utilized. This means all banks in Ethiopia can generate 5 cents by utilizing a single birr asset. The banking industry at least generates a minimum of 0.5% return on asset utilized. This means the banks utilized 1 birr asset at least to get 0.5 cents. Std. Deviation of ROA is 0.008 which implies there is no that much dispersion of the data set. In general all banks in Ethiopia can generate greater than the minimum requirement set by the Basel accord of 1% of return on average assets to be in good position. The findings of this study similar with that of Mekonnen et al. (2015).

- **Capital Adequacy**

Capital adequacy ratio refers to the ability of the capital base of a financial institution to absorb unanticipated shocks. Capital adequacy of any financial institution is instrumental in the formation of risk perceptions about it amongst its stakeholders. Capital adequacies are a measure of the amount of a bank's core capital expressed as a percentage of its assets weighted credit exposures. (Mekonnen et al 2015). The specifics of CAR calculation vary from country to country, but general approaches tend to be similar for countries that apply the Basel Accords. The study takes into consideration Capital adequacy measurement based up on the leverage ratio, which take into consideration core capital which is Tier I capital to total assets. As shown on Table 4.1 the average value of CAR of the banking sector in Ethiopia is 12.6% which is above the minimum requirement set by the Basel accord and adopted by National Bank of Ethiopia of 8%. This implies all banks have a capacity to safeguard their depositors if unanticipated loss occurs. The maximum value of CAR of 19.8% implies there is a tied up capital in the sector while demanding by investors. The minimum value of CAR of 4.2% states that there are some banks holding below the minimum requirement. Std. deviation of 0.04 (4%)

implies there is a little spread among the data series. These findings resemble with the findings of (Mekonnen et al 2015).

- **Asset Quality**

Asset quality is an important parameter for any banking institution, as the quality of its assets has a major role on the earning ability of that institution. A deteriorating quality of assets is the prime source of banking problems. Asset quality measured in relation to the level and severity of non-performing assets, recoveries and the level of provisioning. Knowing the level of asset quality of the banking industry using different tool specifically using non-performing loan data will be very crucial. (Mekonnen et al 2015)

For the purpose of evaluating the quality of asset for Ethiopian banking industry this study is using non-performing loans to total loans ratio. As shown on table 4.1 the average value of the banking sector in Ethiopia is 7.96% which is above the minimum requirement set by National Bank of Ethiopia of 5%. That means non-performing loan management system of the sector is poor. The maximum value of NPL ratio of 53.5% indicates there are banks with higher NPL ratio and have high risk compared to the lower NPL ratio with low risk. Minimum NPL ratio of 0.86% implies there are banks which can meet the minimum statutory obligation of 5%. Std. deviation of asset quality ratio of 9.28% implies the data series is highly dispersed. My study findings are similar to (Mekonnen et al 2015).

- **Management Quality**

Measure of management quality is subjective by its nature. Management quality needs information like qualitative data applicable to individual institution. However several indicators can jointly serve as an indicator of management soundness. The study measure the quality of the manager by using non-interest expense with net income plus non-interest income. The lower this ratio indicates the management capability to control or minimize cost per unit of revenue generated is relatively better than other banks.

The average value for banking industry in Ethiopia of Management quality, which is measured by non-interest expense to net interest income and non-interest income, is 40.6% as shown on table 4.1. This implies Ethiopian banking industry on average consume 0.40 cents to generate a single birr revenue. There are banks which spent maximum 0.91 cents to get one birr revenue. This implies the industry have some managers who cannot manage controllable expenses efficiently. Whereas there

are banks which spent minimum 16% of revenue to cover controllable expenses. This implies the banking industry have somewhat efficient managers who have a capacity to minimize cost up to 0.16 cents to generate one birr revenue. Std. Deviation of 10.8% of MQ ratio indicates there is a very high dispersion on the data series. My study findings similar with the finding of Mulualem: Mekonnen et al (2015).

- **Earning Ability**

The earning ability of specific banks shows how well the performance of the bank is. The higher the performance of the bank is the higher profitability of the banking industry. The earning ability of the banking sector in Ethiopia has been measured by comparing how well the average assets generate net interest income. This study uses net interest income to total loan to measure earning ability of the selected banks. The banking industry in Ethiopia on average generates 7.1% of net interest from every loan granted as shown on table 4.1. This implies the bank industry can generate on average 0.07 cents net interest for a single birr loan granted. There are banks in the sector which can generate maximum of 5.8% of net interest against credit given. This implies the banking industry have managers who can utilize their asset efficiently and generate 0.58 cents for each birr asset utilized. The minimum value of earning ability ratio is 2.1%. This implies even not well performed banks can also generate minimum 0.02 net interests for every birr loan granted. Std. deviation of .05 % of EA ratio indicates very little dispersion on the data set. The findings of my study is resemble with (Mekonnen et al. 2015).

- **Liquidity Management**

Liquidity positions specifically determine how well the banks are liquid in order to cover immediate disturbance to the banks. The liquidity position of the banking sector in Ethiopia have been measured how the liquid asset are able to cover deposit disturbance occur. The higher the ratio indicates the banks are able to control the disturbance that will be occurring. This study uses liquid assets to deposits ratio to measure liquidity position of the banks. As shown on table 4.1 the liquidity position of the banking industry in Ethiopia on average is 44.4%. This implies the banking sector on average hold liquid assets of 0.44 cents for one birr unexpected demand for withdrawal of deposits. The industry has a maximum of 78.2% of liquid assets. This means the banking sector in Ethiopia has liquid assets amount of 0.78 cents for every unanticipated demand of withdrawal of deposits. Moreover, the banking industry scores a minimum of 16.2% liquidity position. This indicates all banks in Ethiopia hold at least 0.16 cents liquid assets for a single birr unanticipated withdrawal from

deposits. In general all banks in Ethiopia meet the minimum requirement of liquidity position of 20% set by the National Bank of Ethiopia. Std. deviation of LM ratio of 16.4% implies a very high dispersion on the observations. The findings of this study resemble that of (Mekonnen et al. 2015).

- **Real GDP**

Real GDP growth rate which measures the economy growth impacted on the performance of commercial banks and also it measures how the growth of the economy at large affects Banks profitability. The higher the ratio indicates the banks are able to grow its profitability. This study uses raw data of real GDP from MOFED. As shown on table 4.1 the real GDP in Ethiopia on average 10.86%, GDP scored minimum of 7.6% and maximum 13.56% which implies that even if the growth of economic activities increase the demand for banking services which contributes to bank profitability insignificant . The findings of this study resemble that of (Tigist 2014).

- **Inflation**

Inflation has an inverse relationship to profitability because an increase in inflation means lowering the profitability of Banks due to higher prices (Saeed 2014). The higher the ratio indicates the banks are in severity. As shown in table 4.1 Inflation in Ethiopia on average 0.14 %, minimum .017% and maximum 0.36%. Which implies that most Banks lend money for longer period of time therefore inflation highly affect their margins and profits. The study finding resemble (Kusa 2013).

4.3. Classical linear regression model (CLRM) Assumption test:

The diagnostic tests were undertaken to ensure that the assumptions of classical linear regression model are concerned, the coefficient estimators of both α (constant term) and β (independent variables) that are determined by ordinary least square (OLS) will have a number of desirable properties, and usually known as Best Linear Unbiased Estimators (BLUE).

Hence, the following sections discuss results of the diagnostic tests (i.e., heteroscedasticity, autocorrelation, multicollinearity, normality and model specification test) that were conducted to ensure whether the data fits the basic assumptions of classical linear regression model or not. The implication of the test, decision rules therein, test results and their discussion are discussed in the upcoming sub sections.

4.3.1 Test for average value of the error term is zero ($E(u_t)=0$) assumption

According to Brooks (2008), if a constant term is included in the regression equation, this assumption will never be violated. Thus, since the regression model used in this study included a constant term, this assumption is not violated.

4.3.2 Heteroskedasticity Test

One of important hypothesis test is Heteroskedasticity Test for finding homogeneity of variance. If there is not the same variance in terms of disruption will be accrued the anisotropy of variance in model. In this model the results of Heteroskedasticity Test based on ARCH are shown on table 4.2 that both the Prob (F-statistic) and chi-square (χ^2) is more than 0.05 and this point probe that the model does not have problem with variance. There is no evidence for the presence of heteroskedasticity.

Table 4.2: Heteroskedasticity Test

Heteroskedasticity Test: ARCH

F-statistic	0.079522	Prob. F(1,94)	0.7786
Obs*R-squared	0.081145	Prob. Chi-Square(1)	0.7758

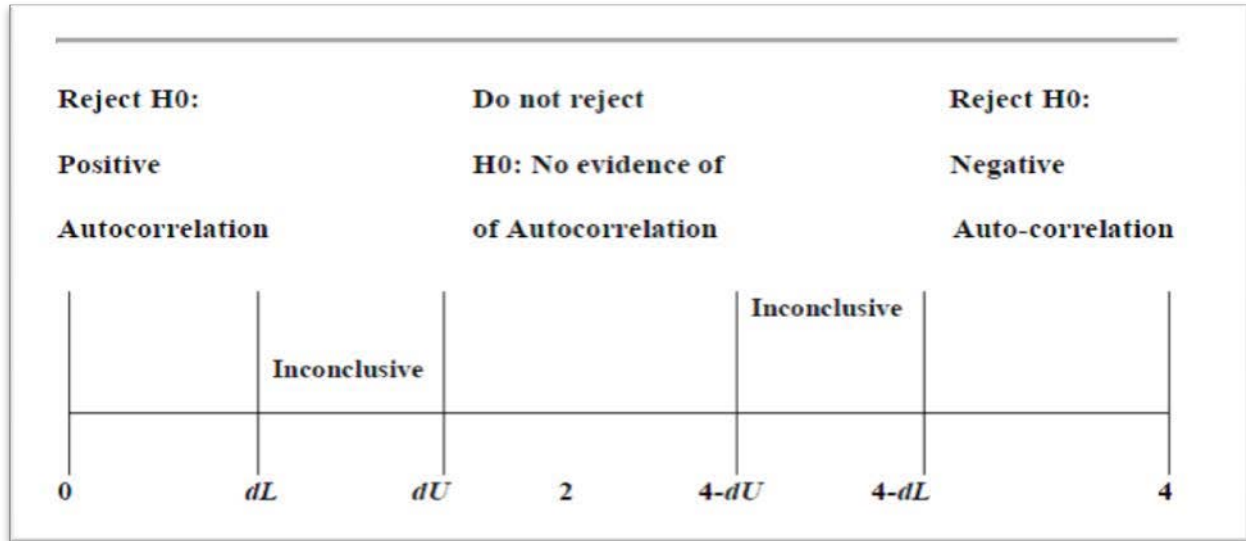
Source: Eviews 8 Output

4.3.3 Test for Absence of Autocorrelation Assumption ($cov(u_i, u_j)=0$ for $i \neq j$)

This is an assumption that the errors are linearly independent of one another (uncorrelated with one another). If the errors are correlated with one another, it would be stated that they are auto correlated. The study used the dL and dU values for 91 observations. As per the DW table in the

appendix (5) for 90 observations with 5 explanatory variables at 5% level of significant, the dL and dU values are 1.406 and 1.636 respectively.

Figure 2 Rejection and Non Rejection Regions for DW Test



As shown on Table 4.3 The DW test statistic value from the regression result is 1.61 and it is between the lower and upper level and also below the conventional value of $DW=2$. Therefore, it falls in the do not reject region and the null hypothesis is rejected. That means the hypothesis is the errors are serially correlated but according to the above result the hypothesis is rejected due to there is no evidence to support the error terms are auto correlated (serially Correlated). Hence the errors are not auto correlated (uncorrelated with one another) which is desirable for CLRM diagnostic assumption test.

Table 4.3 Test for Autocorrelation

Cross-section fixed (dummy variables)

R-squared	0.895565	Mean dependent var	0.029825
Adjusted R-squared	0.872984	S.D. dependent var	0.007372
S.E. of regression	0.002627	Akaike info criterion	-8.878785
Sum squared resid	0.000511	Schwarz criterion	-8.409723
Log likelihood	420.9847	Hannan-Quinn criter.	-8.689547
F-statistic	39.66077	Durbin-Watson stat	1.612552
Prob(F-statistic)	0.000000		

Source Eviews 8 output

4.3.4 Test for Absence of Autocorrelation Assumption ($cov(u_i, u_j) = 0$ for $i \neq j$)

The assumptions stated the covariance between the error terms over time (or cross sections, for that type of data) is zero. In other words, it is assumed that the errors are uncorrelated with one another. If the errors not uncorrelated with one another, it would be stated that they are auto correlated or that they are serially correlated (Brook, 2008).

The study used Breusch-Godfrey test for the existence of Autocorrelation. In addition lagged value of a variable (ROA (-1)) is used in this research in order to adjust autocorrelation. As per Brooks (2008) lagged the value is simply the value that the variable took during a previous period. So from the regression result.

The result indicates that F – Statistic and R- Squared are on null hypothesis of no autocorrelation should not be rejected , since the P – values are considerably in excess of 0.05 .The conclusion is that the null hypothesis of no autocorrelation is not rejected.

Breusch-Godfrey Serial Correlation LM Test:

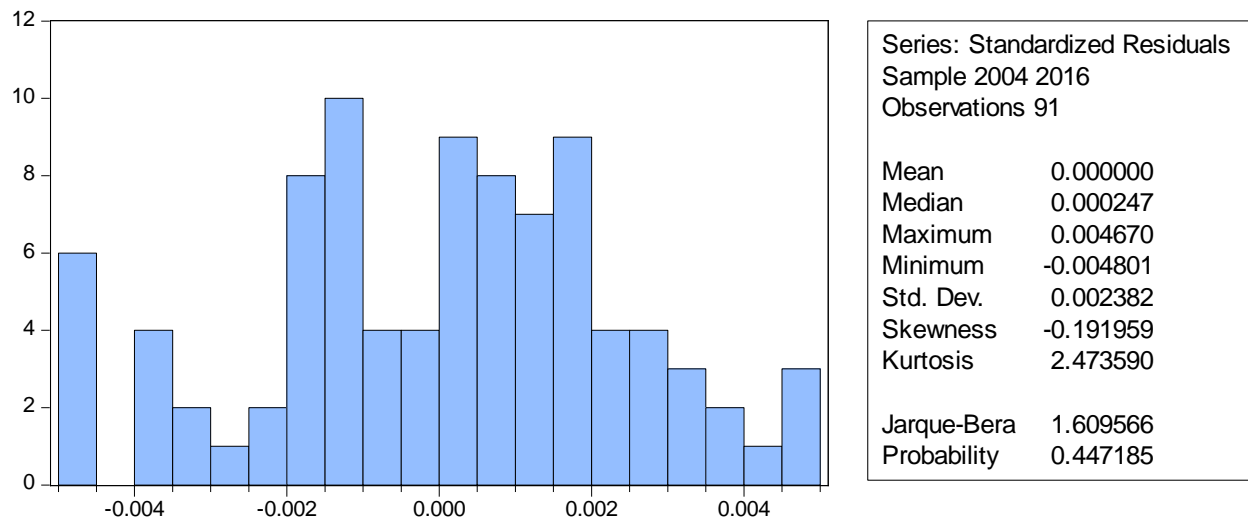
F-statistic	1.940509	Prob. F(4,82)	0.1115
Obs*R-squared	8.387928	Prob. Chi-Square(4)	0.0784

Source: - annual report of sample Banks computed using E – Views 8

4.3.5 Normality Test

According to normality test result, Jarque–Bera test and probability more than 0.05, it is concluded that the normality of distribution of residual sentences and also the skewness and kurtosis of model are probed final model of "Bank Performance" as shown on Figure 3.

Figure 3. Normality Test



Source E-View 8 output

4.3.6 Multicollinearity Test

Multicollinearity means the existence of a “perfect” or exact, linear relationship among some or all explanatory variables (Gujarati D., 2004). As noted in (Gujarati D., 2004) if multicollinearity is perfect, the regression coefficients of the explanatory variables are indeterminate and their standard errors are infinite. If multicollinearity is less than perfect, the regression coefficients, although determinate, possess large standard errors (in relation to the coefficients themselves), which means the coefficients cannot be estimated with great precision or accuracy.

There were different arguments towards the multicollinearity problem. (Gujarati D., 2004) Stated that multicollinearity problems exist when the correlation coefficient among variables greater than 0.75. (Cooper & Schendlar, 2003) Suggested that a correlation above 0.8 between explanatory variables should be corrected for. Lastly, (Hair JF, 2006) argued that also correlation coefficient below 0.9 may not cause serious multicollinearity problem. In contrary to this, (Kennedy, 2008) argued that as any correlation coefficient above 0.7 could cause a serious multicollinearity problem leading to inefficient estimation and less reliable results. A correlation matrix used to ensure the correlation. This study adopts the most conservative view of (Kennedy, 2008) among the other and accepts the problem of multicollinearity if the value is exceeds than 0.7.

Table 4.5 showed that there is no strong pair-wise correlation between the explanatory variables

(CA, AQ, MQ, EA, LM, RGDP,INFLATION). In this study the highest correlation coefficient is -0.440952 between AQ and RGDP. Thus, it can be concluded using the rule of (Kennedy, 2008) the all variables have low correlation power which implies no multicollinearity problem in the explanatory variables selected to financial performance of the commercial banks

Table 4.4: Results of multicollinearity Test: High Pair-Wise Correlation Coefficients

	CA	EA	AQ	INFLATION	LM	MQ	REAL_GDP
CA	1.000000						
EA	0.077418	1.000000					
AQ	-0.407554	-0.102043	1.000000				
INFLATION	0.141873	-0.025162	-0.064223	1.000000			
LM	0.051029	-0.117520	0.409640	0.157362	1.000000		
MQ	0.343793	0.160313	-0.218135	-0.141837	-0.174924	1.000000	
REAL_GDP	-0.260719	-0.078173	0.440952	-0.165702	0.259417	-0.117189	1.000000

Source: Eviews 8 Output

4.4 Model selection Criteria

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).

H_0 : Random Effects model is appropriate

H_1 : Fixed Effects model is appropriate

Decision Rule: Reject H_0 if p-value less than significance level 5%. Otherwise, do not reject H_0 .

As Brooks (2008) referring on his book, the choice between both approaches is done by running a Hausman test. To conduct a Hausman test the number of cross section should be greater than the number of coefficients(regressors) to be estimated. But in this study the numbers of cross section aren't greater than the number of coefficients to be estimated so it is not possible to conduct a Hausman test. In such cases it is often said that the random effects is failed. Therefore we choose Fixed effect model.

4.5 Construction of dummy variables

The non-normality in the residuals from the ROA regression appears to have been caused by a small number of outliers in the regression residuals. Such events can be identified if it is present by plotting the actual values, the fitted values and the residuals of the regression. (See appendix VII).

One way to remove big outliers in the data is by using dummy variables. Removing outlying observations will reduce standard errors, reduce residual sum of square(RSS) and therefore increase R-square(R^2), Thus improving the apparent fit of the model to that data. In order to remove two outliers requires us to construct two separate dummy variables.

As shown below from actual values, fitted values and the residuals of the regression table/graph it can be seen that there are several large outliers but the largest of all occur in cross section 3, early 2004(DUM304) and cross section 6, early, 2004 (DUM604).

Once the two dummy variables have been created, rerun the regression including all the previous variables plus these two dummy variables and the results of this regression are as in the following Table 4.5.

4.6 Analysis and Interpretation of Regression Result

This section presents the regression result of fixed effect model that made to examine the determinant of financial performance of commercial banks in Ethiopia with CAMELS model.

Accordingly, the regression result was made and coefficients of the variables were estimated via E-view version 8 software. As stated earlier in model selection part, fixed effect regression model is an appropriate model used in this study. Thus, the model used to assess the financial performance of commercial banks in Ethiopia with CAMELS model approach in this study was:

The coefficients of explanatory variable were estimated by the use of ordinary least square (OLS) technique. The regression result in Table 4.5 demonstrates both coefficients of explanatory variables and corresponding p-values.

The coefficients of explanatory variable were estimated by the use of ordinary least square (OLS) technique. The regression result in Table 4.5 demonstrates both coefficients of explanatory variables and corresponding p-values.

Table 4.5: Results of Fixed Effect Regression Model

Dependent Variable: ROA

Method: Panel Least Squares

Date: 05/01/18 Time: 14:53

Sample (adjusted): 2004 2016

Periods included: 13

Cross-sections included: 7

Total panel (balanced) observations: 91

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.047854	0.004723	10.13283	0.0000
CA	0.034129	0.015934	2.141888	0.0355
EA	0.010892	0.005153	2.113919	0.0379
AQ	-0.025433	0.005154	-4.934782	0.0000
INFLATION	0.006917	0.003040	2.275171	0.0258
LM	0.000823	0.002207	0.373062	0.7102
MQ	-0.050502	0.003886	-12.99539	0.0000
REAL_GDP	-0.026160	0.026278	-0.995510	0.3227
ROA(-1)	0.039501	0.052794	0.748207	0.4567
DUM304	-0.019141	0.003012	-6.355707	0.0000
DUM604	-0.018586	0.002936	-6.329726	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.895565	Mean dependent var	0.029825
Adjusted R-squared	0.872984	S.D. dependent var	0.007372
S.E. of regression	0.002627	Akaike info criterion	-8.878785
Sum squared resid	0.000511	Schwarz criterion	-8.409723
Log likelihood	420.9847	Hannan-Quinn criter.	-8.689547
F-statistic	39.66077	Durbin-Watson stat	1.612552
Prob(F-statistic)	0.000000		

The starred coefficient estimates are significant at the 1 % (*), 5 % (**) and 10% (***) level.

Source: Eviews 8 output

Thus, based on the result above Table 4.5, the following model was developed to examine the financial performances of commercial banks in Ethiopia in this study.

$$\text{ROA} = 0.047854 + 0.034129\text{CA} + 0.010892\text{EA} - 0.025433\text{AQ} + 0.006917\text{INFLATON} + 0.000823\text{LM} - 0.050502\text{MQ} - 0.026160\text{REAL -GDP} + \varepsilon$$

The estimation results reported in Table 4.5 depicted that, the R-square statistics of the model was 89.55 %. The result indicates that about 89.55% of the variability in the dependent variable Return on Asset) is explained by the independent variables used in the model. That is Asset Quality, Capital Adequacy, Management quality; earning ability, liquidity management, inflation and real GDP collectively explain 89.55% of the change in ROA. The remaining 10.45% of the variability in the dependent variable is left unexplained by the explanatory variables used in the study. This means that the remaining 10.45% of the changes was explained by other variables which are not included in the model.

As shown from the above table the R-square statistics of the model and adjusted R-square was 89.88 % and 87.29% respectively is an indication that a model is fitted nicely. The regression F-statistic (39.66) and the p-value of zero attached to the test statistic reveal that the null hypothesis that all of the coefficients are jointly zero should be rejected. Thus, it implies that the independent variables jointly in the model were able to explain variations in the dependent variable.

Furthermore, the study examined the impact of bank specific internal and macroeconomic external factors on the level of financial performance (ROA) based on regression result of fixed Effect Model in Table 4.5 in terms of examination of coefficients of explanatory variables and significance level.

As shown in the table above among the identified seven determinant factors five of them were significant and considered to be drivers of the banks' profitability in Ethiopian banking industry. These variables are Asset Quality (AQ) which is measured by the non-performing loan to total loans ratio, Capital Adequacy (CA) which is measured by Total capital to total assets ratio, Earning ability (EA) that is measured by Net interest income to total average earning asset and Management Quality (MQ) which is measured by Non-interest expense to net interest income plus no interest income and inflation which is measured by annual inflation rate. Liquidity Management from internal (LM) and RGDP from external variables are insignificant to explain profitability of Ethiopian Commercial Banks.

Through the examination of coefficients for bank specific factors, CA, EA and LM & inflation had positive impact on ROA having a coefficient of 0.03, 0.01 and 0.0008 & 0.0069 respectively.

This shows that a one unit change in CA and EA, LM & Inflation can result a change on ROA by 0.03 0.01 units 0.000 & 0.0069 in the same direction respectively.

However, the variables AQ, MQ & Real GDP had negative impact on ROA having a coefficient of - 0.025, -0.0505 & -0.0261 respectively. This indicates that one unit change (increase/decrease) in AQ and MQ can result a change on ROA by 0.025, 0.0505 and 0.0261 units in opposite direction respectively.

In terms of significance level (corresponding p-value), all explanatory variables had p-values of less than the selected significance levels (1%,5% and 10%) except for LM and Real GDP.

AQ and MQ had negative and statistically significant impact on ROA at 1% level. EA, CA and inflation had positive and statistically significant at 5% level. whereas LM & Real GDP was statistically insignificant on ROA. Thus contrary to the expectation LM and RGDP did not show a significant impact on ROA of commercial banks in Ethiopia.

Dum304 defined as dummy 304=1 for year 2004 and zero otherwise or in other words DUM304 means this dummy variable takes the value 1 for the second bank (cross section 2) in the sample year 2004 and zero elsewhere.

Dum604 defined as dummy 604=1 for year 2004 and zero otherwise or in other words DUM604 means this dummy variable takes the value 1 for the sixth bank (cross section 6) in the sample year 2004 and zero elsewhere.

By comparing the results with those of the regression that excluded the dummy variables, it can be seen that the coefficient estimates on the remaining variables change quite a bit in this instance and the DW-test value before included the dummy was 1.44 but after included dummy variable DW-test value become 1.61 which makes the hypothesis test of the assumption of no-autocorrelation between variable test become valid. In addition R-square, adjusted R-square value and RSS (residual sum sq.) of 0.89, 0.87 and 0.002 respectively.

The coefficient attached to the dummy variables in (regression Table 4.5) are known as the differential intercept coefficients because they tell by how much the value of the intercept that received the value of 1 differ from the intercept coefficient of the benchmark category.

4.7 Results and Summaries of the Findings of Econometrics Statistics

As stated on introduction section of this research paper, the main purpose of the study was to evaluate the financial performance of Ethiopian commercial banks with bank specific internal and macroeconomic external factors and the extent the variables affect financial performance of commercial banks in Ethiopia. To attain these objectives 7 hypothesis (see below) were developed based on theories and past empirical studies. Moreover in this study ROA used as a proxy for performance measure.

- H1: There is a positive and significant relationship between capital adequacy ratios and performance of the banks.
- H2: There is a negative and significant relationship between asset quality ratios and performance of the banks.
- H3: There is a negative and significant relationship between management efficiency ratios and performance of the banks.
- H4: There is a positive and significant relationship between earnings ratios and performance of the banks.
- H5: There is a positive and significant relationship between liquidity ratios and performance of the banks.
- H6: There is a positive and significant relationship between real Gross Domestic Product(RGDP) and performance of the banks.
- H7: There is a negative and significant relationship between inflation and performance of the banks.

The regression results of those 7 hypotheses are discussed below.

4.7.1 Capital Adequacy (CA)

H1: There is a positive and significant relationship between capital adequacy ratios and performance of the banks.

According to theories and past empirical studies the researcher hypothesized that there will be a significant relationship between capital adequacy and financial performance of Commercial Banks in Ethiopia. The results of fixed effect model in the above Table 4.5 indicate that there is a positive and statistically significant impact of CA on the level of ROA. The Capital Adequacy (CA) which is measured by capital to total asset ratio appears to have positive relationship with profitability. As literature is not one sided on the effect of the CAR on profit performance, the a priori restriction was set to consider either of the signs. The result witnessed a positive relation and, the effect of CAR on profitability appears significant. Hence, the CAR is a significant driver of profitability performance of commercial banks with a coefficient of 0.034129 and p-value 0.0355 at 5% significance level. This implies that a one unit change in CA holding the average value of other independent variables constant had resulted in a 0.034129 unit change in ROA. Hence, regulatory measures that insist on holding a high level of capital seems to strengthen the risk bearing capacity of banks and improving their profit performance.

This is revealed in some studies, Brouke (1989), Berger (1995) and Molyneux (1993), whose outcome reveals that the impact of leverage or capitalization on bank profitability is ambiguous, and also that higher levels of equity would decrease the cost of capital, leading to a positive impact on bank profitability. Such way of argument in fact might not be applicable to Ethiopian banks which are with excess liquidity standing and which usually are not using capital to meet their day to day liquidity needs.

Based on the result, hypothesis 1 is not rejected and we can also conclude that CA had Positive and significant effect on financial performance (ROA) of Ethiopian commercial banks. The finding was consistence with the previous empirical finding of (Sangmi et al., 2010) which states that Capital adequacy ratio shows the internal strength of the bank to withstand losses during crisis. Capital

adequacy ratio is directly proportional to the resilience of the bank to crisis situations. It has also a direct effect on the profitability of banks by determining its expansion to risky but profitable ventures or areas.

4.7.2 Asset Quality (AQ)

H2: There is a negative and significant relationship between asset quality ratios and performance of the banks.

According to theories and past empirical studies the researcher hypothesized that there will be a significant relationship between asset quality and financial performance of commercial Banks in Ethiopia.

The results of fixed effect model in the above table 4.5 of regression analysis indicate that there is a negative and statistically significant impact of AQ on the level of ROA. The result shows the effect of asset quality (AQ) which is measured by non-performing loan to total loan in the regression model which is an indicator of the level of credit risk has negative effect on profitability (ROA) with a coefficient of -0.025433 and a p-value of 0.0000 at 1% significance level. This implies that for one unit change in AQ, keeping the other things constant had resulted 0.00010 unit change on the average level of ROA in opposite direction. A negative relationship could mean a decline in non-performing loan results in rise of banks performance holding average value of other independent variables constant and vice-versa. This is in line with the initial a priori assumptions. In addition the variable is significant in explaining the variability in the return on assets of Ethiopian commercial banks at 1% significant level.

Based on the result, hypothesis 2 is not rejected and also we can conclude that AQ had negative and significant effect on financial performance of Ethiopian commercial banks. The finding was consistence with the previous empirical study of (Dang 2011), (Liu et al., 2010) also found out that the highest risk facing a bank is loses derived from delinquent loans and it highly affects performance of Banks. Hence, the deterioration in credit quality reduces ROA. (Sangmi et al., 2010) also found that low nonperforming loans to total loans shows that the good health of the portfolio a bank. The lower the ratio the better the bank performing.

4.7.3 Management Quality (MQ)

H3. There is a negative and significant relationship between management efficiency ratios and performance of the banks.

According to theories and past empirical studies the researcher hypothesized that there will be a negative and significant relationship between Management quality and financial performance of commercial Banks in Ethiopia.

Measure of management quality is subjective by its nature. Management quality needs information like qualitative data applicable to individual institution. However several indicators can jointly serve as an indicator of management soundness. The study measure the quality of the manager by using non-interest expense to net interest income plus interest income ratio. The coefficient of the variable management quality (MQ) is -0.050502 (-5%) and its p-value 0.0000 meaning that a 1unit change in the management quality will bring a 6units decline in ROA holding average value of other independent variable constant and statistically significant at 1% significant level. Therefore based on the above result of table 4.5 the researcher is failed to reject the null hypothesis 3 that management quality has significant negative effect on banks performance. The other important ratio is that proxy management quality is expense to asset ratio. The finding was consistent with (Athanasoglou et al. 2005) also found that the ratio of operating expenses to total asset is expected to be negatively associated with profitability. Management quality in this regard, determines the level of operating expenses and in turn affects profitability.

4.7.4 Earning Ability (EA)

H4: There is a positive and significant relationship between earnings ratios and performance of the banks.

Based on theories and past empirical studies the researcher hypothesized that there will be a significant and positive relationship between Earning ability and financial performance of commercial Banks in Ethiopia. Table 4.5 presented that, there is a positive and statistically significant relationship between EA and financial performances of commercial banks. The coefficient of earning Ability (EA) measured by Net Interest Income to Average Earning Assets is 0.010892 and its P-value is 0.0379. Holding other independent variables constant at their average value, when earning Ability (EA) increased by one percent, return on Asset (ROA) of sampled Ethiopian commercial banks

would be increased by 0.08 units and statistically significant at 5% significance level . Therefore, based on the result the researcher is failed to reject the null hypothesis 3 and concluded that earning Ability had a positive and significant effect on financial performance of Commercial banks in Ethiopia. The finding was consistence with the previous empirical study of (Sangmi et al., 2010) also found that A consistent profit not only builds on public confidence in a bank but it also absorbs loan losses and provides sufficient provisions. It is also necessary for a balanced financial structure and helps to provide shareholder reward. Thus consistently healthy earnings are essential for sustainability in banking institutions.

4.7.5 Liquidity Management (LM):

H5: There is a positive and significant relationship between liquidity ratios and performance of the banks.

Based on theories and past empirical studies the researcher hypothesized that there will be a significant relationship between Liquidity management and financial performance of commercial Banks in Ethiopia.

The liquid asset to deposit ratio (LM), which measures the liquidity level of banks, is found to be positively related with profit. The results of fixed effect model in the above table 4.5 indicate that there is a positive but statistically insignificant impact of LM on the level of ROA with a coefficient 0.000823 and a p-value of 0.7102. Based on the result hypothesis 5 is rejected and also we can conclude that LM had insignificant effect on financial performance of Ethiopian commercial banks.

Like the CAR, literature witnessed the ambiguity of the impact of liquidity on bank performance. There are studies which found out positive relationship (Dang 2011), negative relationship (Berger et al., 2009) and even no relationship (Sun et al., 2011). However, the result of the study revealed positive but insignificant relationship with profitability. This appears in contradiction with Berger and (Bouwman 2009) that argued if liquidity reserves are imposed by law will be a burden for banks and this will result in negative relationship. Despite the regulatory requirement for Ethiopian banks to maintain 15% of their deposit in the form of liquid assets, as shown the descriptive statistics, the commercial banks were operating with excess liquidity. The minimum liquidity level historically registered in the industry is 16%.which is in fact is above the statutory requirement. Hence, from the finding of this study, the positive relationship seems an outcome of excess liquidity which allows

banks to diversify their income via engaging themselves in nontraditional banking services like foreign operation and investment. The advantage of this strategy has both income and cost elements: it ensures income diversification is maintained and above all will reduce the provision expense via directing funds to non-credit related activities.

4.7.6 Inflation

H6. There is a negative and significant relationship between inflation and performance of the Bank

Based on theories and past empirical studies the researcher hypothesized that there will be a negative significant relationship between Inflation and financial performance of commercial Banks in Ethiopia. he annual rate of inflation is found to have positive and significant driver of profitability. This seems a surprising result as banks in Ethiopia does not seem to be affected by the change in real interest rate as the variation in interest rate in both the asset and liability side is constant and usually has fixed nature. Even it varies; they have the discretion to adjust their rate in a way to maintain the spread. Hence, the argument on the effect of inflation on the asset and liability prices cannot be valid. However, the effect of inflation on the debt repayment capacity of the borrowers as well as on banks' ability to mobilize resources from the market which both increases expenses can be a convincing argument for the result. The results of fixed effect model in the above table 4.5 indicate that there is a positive but statistically insignificant impact of inflation on the level of ROA with a coefficient 0.006917 and a p-value of 0.0258. The coefficient of the variable in the model however is not large to explain the firm impact of inflation on profitability. Literature also revealed a confusing result with regard to the effect of inflation on bank performance. Some scholars say that the relationship between inflation and banks profitability is debatable (Athanasoglou 2005), the direction of relationship is unclear (Vong et al., 2009) or the effect depends on whether inflation is anticipated or unanticipated (Perry 1992).

4.7.7 Real GDP

H6. There is a positive and significant relationship between real GDP and performance of the Bank

If GDP growth is high, the loan request increases and thus the banks can obtain bigger profits. On the contrary, if the GDP growth slows, the banks are confronted with an increased credit risk,

increasing provisions and subsequently the profitability is reduced. Bad economic conditions can worsen the quality of the loan portfolio, generating credit losses, which eventually reduce banks.

The above table 4.5 indicates that there is a negative & insignificant coefficient -0.026160 and P-value 0.3227. Literature also examined real GDP insignificant impact on Ethiopian Banks profitability (Amdemikael 2012) & (Tigist 2014)

4.7.8 DUM304 and DUM604

The coefficient attached to the dummy variables must always be interpreted in relation to the base, or reference, group-that is, the group that receives the value of zero.

Table 4.6 Summary of Regression Results

Comparison of the Test Result with the Expectation

No.	Independent Variables	Expected relationship with dependant variable (ROA)	Actual Result	Satus
Hypothesis 1	CA	+ve	+ve and significant	Not Rejected
Hypothesis 2	AQ	-ve	-ve and significant	Not Rejected
Hypothesis 3	MQ	-ve	-ve and significant	Not Rejected
Hypothesis 4	EA	+ve	+ve and significant	Not Rejected
Hypothesis 5	LM	+ve	+ve and insignificant	Rejected
Hypothesis 6	GDP	+ve	-ve and insignificant	Rejected
Hypothesis 7	INFLATION	-VE	+ve significant	Not Rejected

4.8 Summary of Econometrics Statistics

The econometrics analysis has been done in order to see the relationship and effects of the independent variable and the dependent variable. The study examined the impact of bank specific factor & macro-economic factor (CAMELS) on the level of financial performance (ROA) based on regression result of fixed Effect Model in Table 4.5 in terms of examination of coefficients of explanatory variables and significance level. Among the identified seven banks specific determinant factors five of them were significant and considered to be drivers of the banks' profitability in Ethiopian banking industry. These variables are Asset Quality (AQ) which is measured by the non-performing loan to total loans ratio, Capital Adequacy (CA) which is measured by Total capital to total assets ratio, Earning ability (EA) that is measured by Net interest income to total average earning asset and Management Quality (MQ) measured by Non-interest expense to net interest income plus non-interest income, and Inflation. The Liquid assets to total deposit ratio (LM) and real GDP was the variable insignificant to explain profitability. Capital adequacy, Earning ability, Liquidity management and inflation affect performance positively but asset quality and management quality affect performance negatively.

CHAPTER FIVE

Conclusion and Recommendation

5.1. Conclusion

CAMELS model is a tool mainly used to evaluate the financial performance of banks. The study not only examine each Camels factors to know the factor which have significant contribution for financial performance of Ethiopian banks but also estimates the extent of each factors to check how much the variables affect the banks performance.

The study shows that Ethiopian banking industry on average can generate revenue 3% of the assets utilized. Hence, all banks in Ethiopia can generate greater than the minimum requirement set by the Basel accord of 1% of return on average assets to be in good position. This finding is also resembled with findings of (Mekonnen et al. 2015).

Capital adequacy ratio refers to the ability of the capital base of a financial institution to absorb unanticipated shocks. Capital of Ethiopian Banks has the ability to cover any shock that will occur in any circumstances. The banks in Ethiopia have no such problem regarding capital adequacy which all the banking sector have average greater than 8%, which is set by the Basel accord and to the standard set by the national bank of Ethiopia. The findings of this study similar with the findings of (Mulualem 2015).

The Asset quality dimension of CAMELS framework findings of this study indicates that private banks are good in credit management than the public bank (CBE) which indicates that the private banks have efficient system to manage their non-performing loan and also the private banks are efficient in using of their deposit. The proper use of resource can have a direct impact to the growth of the economy. Ethiopian banking industry has shown a decrease of non-performing loan ratio from year to year, which is a good sign to the most risky industry. Ethiopian banking industry indicates a strong asset quality and minimal portfolio risks. The findings of this study resemble with that of (Mekonnen et al. 2015)

The management quality, which is measured by noninterest expense to net interest income plus non-interest income, findings of this study shows that the banking industry in Ethiopia spent more of the non-interest income to the non-interest expense, like for employee salary and benefit, provision for doubtful loans expense and general expense. Ethiopian banks manager are said to be somewhat efficient, because the higher portion of the non-interest income spent on non-interest expense.

Earning quality of Ethiopian banks for this study has been analyzed by using two measurements. These are ROA and profit margin. Earning ability state how well manager make control to the asset of the bank and equity in order to get a better earning. For the last eleven years on average Ethiopian banks score ROA of 3%. This result revealed that Ethiopian banking industry is greater than the minimum point set by the accord which indicates banks that score above 1% are said to be strong. Profit margin is used to determine how well the bank is profitable by properly control its costs. The higher the ratio is explaining the better performance of the banks. In general, the health of the banks based on profit margin, Ethiopian banks are in a good level. Compared to private and state owned banks in Ethiopia, profit margins of the public banks fulfill the average standard to a certain extent but not the private banks except Construction and Business Bank. This study finding is contradicted with the findings of (Mekonnen et al. 2015).

Liquid Asset to Deposit Ratio indicates how well the banks liquid assets have the ability to cover immediate disturbance made to the deposit. Deposit is an obligation of the banks to pay for the depositor during request. The higher the ratio is the more liquidity position of the bank. National bank of Ethiopia state that banks to be said strong should meet the average greater than 25%. The industry average for the last ten years in Ethiopia is higher. This is a good indication for the bank to attract more customers because customer will be free of fear to deposit in the banks. But sometimes the higher the ratio also indicates that the banks have higher tied money in their account. High-unutilized money in banks indicates resource mobilization not be accessed easily to other who needs to invest. The findings of this study resemble with the findings of (Mekonnen et al., 2015).

The macroeconomic factors are recently getting focus both theoretically and empirically as the most relevant factors affecting the performance of commercial banks operating in a given economic environment. From the empirical evidence, the researcher expects positive and highly significant impact of Ethiopia real GDP growth and banks profitability. However the study found that real GDP growth rate which measures the economy growth of Ethiopia has not impacted significantly on the

performance of commercial banks. Even if Ethiopian economy growth could create a new and potential demand for financial services and it might reduce the probability of non-performing loan. The findings of this study resemble with the findings of (Tigist 2014)

Inflation has one of macroeconomic variables shows an inverse relationship to profitability because an increase in inflation means lowering the profitability of Banks due to higher prices. From the empirical results the study expects negative impact on profitability. But inflation shows that positive significant effect on the performance of the Bank. This shows that regulators accurately anticipating the level of inflation impact on Commercial Banks profitability.

The econometric statistics result revealed the capital adequacy, earning ability and inflation have significant positive influence on the financial performance of Ethiopian commercial banks. Whereas asset quality and management quality have significant negative influence on the performance of Ethiopian banks measured using return on asset. But liquidity position and real GDP of Ethiopian banks is insignificant to influence the financial performances. The findings of this study resembled with that of (Mekonnen et al., 2015)& (Tigist 2014).

5.2. Recommendation

Based on the research findings, the study makes the following recommendations for Banks.

The paper analyzes the performance of Ethiopian banks by considering bank specific & Macroeconomic factors (real GDP & Inflation) with CAMELS model approach on banks' profitability for the 2003-2016 periods. The study finds capital adequacy, asset quality, management quality earning ability and inflation are the drivers for the financial performance of Commercial Banks in Ethiopia. High performance is related to the ability of banks to control their capital adequacy, asset quality (credit risk), earning ability, their overhead expenses (management quality) and accurate prediction on inflation. In addition, the paper finds that bank's liquidity and GDP status is not significant to affect the performance of the banks.

Hence as a matter of policy implication it is recommended that:-Ethiopian banks need to develop their credit risk management capacity- the high level of nonperforming assets mainly loans and advances are affecting the profitability of Banks. Hence, improving performance require to institute a strong credit risk management system that can efficiently identify bankable borrowers and a system

that can monitor their performance after the loan is granted. In addition, the regulatory framework should support and make sure banks to have strong credit risk management practice. This can be done through strengthening the internal risk management system to assist the identification, measurement and monitoring of credit risk as well as directing the supervision focus towards credit risk.

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

There should also be control over overhead costs- the share of overhead costs (non-interest expense) in the total expense appears to be a significant determinant factor of performance. Therefore Banks should engage themselves in cost control activities like introducing technology based banking services and limiting excessive branch expansions which potentially reduce costs via reducing the number of staff to be employed and the branch opening costs. This should however be done without compromising the future growth motives of banks. Moreover, CAMELS framework can well measure Ethiopian banks. Therefore, Banks are highly recommended to use CAMELS framework as their measurement tools.

Besides GDP growth simultaneously affect profitability which is in a growing economy as expressed by positive GDP growth, the demand for credit is high due to the nature of business cycle. However the study revealed insignificant effect on profitability. In general, as many literatures supports financial intermediation in Ethiopia is still in infant stage. Thus, Ethiopian commercial banks should focus to reach this unmet demand of finance by adjusting their strategy with the government regulation.

Finally Given this feature, an increase in the rate of inflation drives down the real rate of return not just on money, but on assets in general. Hence, there is significant relationship between increase in inflation rate and banks profitability. The researcher recommended that anticipating the interest rates accordingly, resulting in revenues to increase faster than costs and subsequently, and having positive impact on bank profitability.

For future research:

As a suggestion for further studies, it would be interesting to add several independent variables to examine the determinants of financial performance of Commercial Banks in Ethiopia to see if that would generate a different result. Since one of the restrictions is that the model of this study doesn't contain macro-variables like foreign exchange rate and an interest rate to see how these are correlated to the financial performance of banks.

The scope of this paper was to discuss and provide the determinants of financial performance of bank's only in Ethiopia. However, this framework is also equally important to evaluate the financial performance of other financial institution like insurance and microfinance found in Ethiopia as well as other countries..

It would also be motivating to do a comparison between Ethiopian Banks and banks in other countries in the region or worldwide by considering monetary and non-monetary information as well as quantitative and qualitative data.

There is a vast scope for further research in the area of bank performance. There are several areas such as efficiency of banks, effective implementation of internal management practice and so on that must be studied to contribute in better understanding of performance assessment of banks.

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Appendixes

Appendix I

Descriptive Statistics

	ROA	CA	EA	AQ	INFLATIO N	LM	MQ	REAL_GD P
Mean	0.028596	0.126279	0.071136	0.079635	0.141465	0.444667	0.406840	0.108693
Median	0.029800	0.128250	0.061550	0.048539	0.102000	0.435000	0.396650	0.109000
Maximum	0.046800	0.198600	0.581200	0.535000	0.358900	0.782000	0.913800	0.135600
Minimum	0.003800	0.041200	0.021300	0.008600	0.017000	0.162100	0.160200	0.076000
Std. Dev.	0.008494	0.042798	0.058295	0.092898	0.095096	0.158706	0.108555	0.015569
Skewness	-0.775095	-0.189597	7.249954	2.960956	0.855919	0.334565	0.980774	-0.269177
Kurtosis	3.442051	2.555189	62.19218	12.33232	2.581958	2.257302	6.558521	2.664230
Jarque-Bera	10.61052	1.395049	15165.34	498.8251	12.67935	4.080624	67.41886	1.643815
Probability	0.004965	0.497816	0.000000	0.000000	0.001765	0.129988	0.000000	0.439592
Sum	2.802370	12.37534	6.971350	7.804253	13.86359	43.57735	39.87033	10.65190
Sum Sq. Dev.	0.006998	0.177669	0.329630	0.837110	0.877204	2.443182	1.143064	0.023513
Observation s	91	91	91	91	91	91	91	91

Appendix II

Regression Analysis

Dependent Variable: ROA
 Method: Panel Least Squares
 Date: 05/01/18 Time: 14:53
 Sample (adjusted): 2004 2016
 Periods included: 13
 Cross-sections included: 7
 Total panel (balanced) observations: 91

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.047854	0.004723	10.13283	0.0000
CA	0.034129	0.015934	2.141888	0.0355
EA	0.010892	0.005153	2.113919	0.0379
AQ	-0.025433	0.005154	-4.934782	0.0000
INFLATION	0.006917	0.003040	2.275171	0.0258
LM	0.000823	0.002207	0.373062	0.7102
MQ	-0.050502	0.003886	-12.99539	0.0000
REAL_GDP	-0.026160	0.026278	-0.995510	0.3227
ROA(-1)	0.039501	0.052794	0.748207	0.4567
DUM304	-0.019141	0.003012	-6.355707	0.0000
DUM604	-0.018586	0.002936	-6.329726	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.895565	Mean dependent var	0.029825
Adjusted R-squared	0.872984	S.D. dependent var	0.007372
S.E. of regression	0.002627	Akaike info criterion	-8.878785
Sum squared resid	0.000511	Schwarz criterion	-8.409723
Log likelihood	420.9847	Hannan-Quinn criter.	-8.689547
F-statistic	39.66077	Durbin-Watson stat	1.612552
Prob(F-statistic)	0.000000		

Appendix III

Heteroskedasticity Test: ARCH

F-statistic	0.079522	Prob. F(1,94)	0.7786
Obs*R-squared	0.081145	Prob. Chi-Square(1)	0.7758

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 05/01/18 Time: 15:23

Sample (adjusted): 3 98

Included observations: 96 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.68E-05	4.05E-06	4.155358	0.0001
RESID^2(-1)	0.029073	0.103098	0.281997	0.7786
R-squared	0.000845	Mean dependent var		1.73E-05
Adjusted R-squared	-0.009784	S.D. dependent var		3.54E-05
S.E. of regression	3.55E-05	Akaike info criterion		-17.63178
Sum squared resid	1.19E-07	Schwarz criterion		-17.57835
Log likelihood	848.3253	Hannan-Quinn criter.		-17.61018
F-statistic	0.079522	Durbin-Watson stat		1.995742
Prob(F-statistic)	0.778566			

Appendix IV

Breusch-Godfrey Serial Correlation LM Test:

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.940509	Prob. F(4,82)	0.1115
Obs*R-squared	8.387928	Prob. Chi-Square(4)	0.0784

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 10/14/17 Time: 15:25

Sample: 2 98

Included observations: 98

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005744	0.005620	1.022132	0.3097
CA	0.006233	0.013869	0.449409	0.6543
EA	-0.003725	0.008175	-0.455632	0.6499
AQ	-0.001236	0.006919	-0.178570	0.8587
INFLATION	-0.003309	0.005155	-0.641903	0.5227
LM	-0.000988	0.003454	-0.286156	0.7755
MQ	-0.003004	0.005220	-0.575440	0.5666
REAL_GDP	-0.007234	0.033240	-0.217644	0.8282
ROA(-1)	-0.114903	0.093309	-1.231422	0.2217
DUM304	0.000836	0.004986	0.167658	0.8673
DUM604	0.003520	0.004944	0.711937	0.4785
RESID(-1)	0.381613	0.143969	2.650650	0.0096
RESID(-2)	0.007265	0.118599	0.061257	0.9513
RESID(-3)	0.114014	0.117624	0.969309	0.3352
RESID(-4)	-0.036271	0.113626	-0.319218	0.7504

R-squared	0.086473	Mean dependent var	-6.29E-18
Adjusted R-squared	-0.069494	S.D. dependent var	0.004195
S.E. of regression	0.004339	Akaike info criterion	-7.901190
Sum squared resid	0.001544	Schwarz criterion	-7.503039
Log likelihood	398.2077	Hannan-Quinn criter.	-7.740198
F-statistic	0.554431	Durbin-Watson stat	1.972364
Prob(F-statistic)	0.892087		

Appendix V

Raw Data

	Banks	YEAR	ROA	CA	AQ	MQ	EA	LM	real GDP	INFLATION
CBE	1	2003	0.0225	0.0412	0.382	0.2653	0.0321	0.6723	0.1356	0.089
CBE	1	2004	0.0119	0.0423	0.473	0.2874	0.0372	0.6873	0.1281	0.102
CBE	1	2005	0.0172	0.0431	0.535	0.2795	0.0371	0.6887	0.126	0.099
CBE	1	2006	0.0232	0.042	0.3768	0.2503	0.0563	0.7497	0.115	0.116
CBE	1	2007	0.0218	0.0971	0.2752	0.3849	0.0702	0.7806	0.118	0.172
CBE	1	2008	0.029	0.0905	0.2245	0.2338	0.0581	0.474	0.112	0.303
CBE	1	2009	0.035	0.0848	0.1452	0.1602	0.0834	0.3591	0.1	0.242
CBE	1	2010	0.0295	0.0749	0.0533	0.2513	0.0832	0.2855	0.106	0.017
CBE	1	2011	0.0304	0.0548	0.0366	0.279	0.0824	0.3569	0.114	0.201
CBE	1	2012	0.0398	0.0486	0.0188	0.1986	0.0807	0.2153	0.087	0.335
CBE	1	2013	0.0343	0.0459	0.0086	0.2404	0.1001	0.233	0.099	0.049
CBE	1	2014	0.0304	0.0441	0.02	0.296	0.0981	0.1621	0.103	0.11
CBE	1	2015	0.03	0.0456	0.0099	0.2682	0.0991	0.2505	0.102	0.064
CBE	1	2016	0.0304	0.0471	0.0101	0.2732	0.0997	0.2536	0.076	0.095
DB	2	2003	0.0136	0.06253	0.07235	0.4372	0.0472	0.3452	0.1356	0.089
DB	2	2004	0.0209	0.06951	0.082359	0.4586	0.0492	0.3592	0.1281	0.102
DB	2	2005	0.0208	0.0711	0.0889	0.467	0.0493	0.3604	0.126	0.099
DB	2	2006	0.0334	0.0969	0.062143	0.3833	0.0553	0.3112	0.115	0.116
DB	2	2007	0.0353	0.1029	0.059533	0.3418	0.0569	0.3438	0.118	0.172
DB	2	2008	0.0345	0.1054	0.058861	0.3449	0.0589	0.4739	0.112	0.303
DB	2	2009	0.0285	0.1035	0.073863	0.3662	0.0529	0.5934	0.1	0.242
DB	2	2010	0.0293	0.1017	0.02998	0.3601	0.0464	0.518	0.106	0.017
DB	2	2011	0.0334	0.1034	0.033839	0.3418	0.0448	0.5258	0.114	0.201
DB	2	2012	0.0405	0.1136	0.024447	0.3208	0.06	0.4105	0.087	0.335
DB	2	2013	0.0326	0.1098	0.029693	0.3873	0.0599	0.3824	0.099	0.049
DB	2	2014	0.0342	0.1246	0.032867	0.3908	0.0591	0.37	0.103	0.11
DB	2	2015	0.0312	0.1252	0.040686	0.4785	0.0648	0.2791	0.102	0.064
DB	2	2016	0.0333	0.1276	0.040692	0.4792	0.0679	0.2796	0.076	0.095
AIB	3	2003	0.0099	0.1156	0.05759	0.5263	0.05623	0.4475	0.1356	0.089
AIB	3	2004	0.0147	0.1011	0.052634	0.2635	0.0456	0.4472	0.1281	0.102
AIB	3	2005	0.0171	0.1024	0.2513	0.5217	0.0465	0.4464	0.126	0.099
AIB	3	2006	0.0301	0.1174	0.09562	0.3833	0.0475	0.3619	0.115	0.116
AIB	3	2007	0.0422	0.1278	0.073646	0.274	0.0607	0.3625	0.118	0.172
AIB	3	2008	0.033	0.1381	0.086635	0.3565	0.053	0.4766	0.112	0.303
AIB	3	2009	0.0254	0.1334	0.057795	0.4335	0.0576	0.6422	0.1	0.242

AIB	3	2010	0.0345	0.1309	0.054663	0.3403	0.0472	0.6621	0.106	0.017
AIB	3	2011	0.0399	0.148	0.038685	0.2966	0.0465	0.5228	0.114	0.201
AIB	3	2012	0.0339	0.142	0.019058	0.3575	0.0697	0.3434	0.087	0.335
AIB	3	2013	0.0328	0.1337	0.022907	0.421	0.0684	0.2847	0.099	0.049
AIB	3	2014	0.0327	0.1336	0.031578	0.4269	0.0669	0.3365	0.103	0.11
AIB	3	2015	0.0294	0.1408	0.024174	0.4819	0.0659	0.2096	0.102	0.064
AIB	3	2016	0.0301	0.1419	0.024275	0.4867	0.0692	0.3021	0.076	0.095
BOA	4	2003	0.0045	0.1345	0.13456	0.3275	0.05623	0.4752	0.1356	0.089
BOA	4	2004	0.0239	0.1257	0.122719	0.5192	0.5812	0.4625	0.1281	0.102
BOA	4	2005	0.0297	0.1235	0.2843	0.3109	0.0583	0.4665	0.126	0.099
BOA	4	2006	0.0348	0.1644	0.049383	0.3184	0.0632	0.3588	0.115	0.116
BOA	4	2007	0.0215	0.1294	0.105423	0.5411	0.0616	0.3756	0.118	0.172
BOA	4	2008	0.0038	0.1095	0.128705	0.9138	0.0564	0.4148	0.112	0.303
BOA	4	2009	0.0206	0.1065	0.1475	0.503	0.0605	0.6	0.1	0.242
BOA	4	2010	0.0239	0.0996	0.069754	0.4253	0.0427	0.5764	0.106	0.017
BOA	4	2011	0.0267	0.0975	0.039696	0.4313	0.0628	0.4767	0.114	0.201
BOA	4	2012	0.0279	0.1168	0.037556	0.4392	0.0742	0.3726	0.087	0.335
BOA	4	2013	0.0236	0.1206	0.02752	0.4392	0.0615	0.5739	0.099	0.049
BOA	4	2014	0.0257	0.1429	0.033735	0.4956	0.0811	0.6	0.103	0.11
BOA	4	2015	0.0234	0.1452	0.053669	0.5528	0.0805	0.5642	0.102	0.064
BOA	4	2016	0.0261	0.1461	0.053672	0.5532	0.0815	0.5649	0.076	0.095
WB	5	2003	0.0124	0.1121	0.04862	0.5025	0.05321	0.4123	0.1356	0.089
WB	5	2004	0.0281	0.1215	0.11725	0.4521	0.0512	0.47235	0.1281	0.102
WB	5	2005	0.0297	0.1114	0.1086	0.5078	0.0579	0.4814	0.126	0.099
WB	5	2006	0.0366	0.1316	0.048458	0.4919	0.0534	0.3718	0.115	0.116
WB	5	2007	0.039	0.1404	0.052509	0.4226	0.0603	0.4847	0.118	0.172
WB	5	2008	0.0365	0.1592	0.083884	0.4421	0.0633	0.608	0.112	0.303
WB	5	2009	0.0391	0.181	0.076995	0.3412	0.0711	0.782	0.1	0.242
WB	5	2010	0.0411	0.1937	0.034743	0.3515	0.0693	0.7739	0.106	0.017
WB	5	2011	0.0468	0.1938	0.035104	0.359	0.0738	0.6951	0.114	0.201
WB	5	2012	0.041	0.1955	0.029802	0.3548	0.0846	0.4847	0.087	0.335
WB	5	2013	0.0366	0.1953	0.026953	0.4184	0.0881	0.3675	0.099	0.049
WB	5	2014	0.0282	0.1982	0.02627	0.5225	0.0933	0.2134	0.103	0.11
WB	5	2015	0.0282	0.1935	0.042104	0.5628	0.0912	0.2479	0.102	0.064
WB	5	2016	0.0287	0.1962	0.042113	0.5632	0.0916	0.2482	0.076	0.095
UB	6	2003	0.01067	0.1123	0.034251	0.4025	0.0416	0.4925	0.1356	0.089
UB	6	2004	0.0104	0.1325	0.037564	0.4117	0.0472	0.5231	0.1281	0.102
UB	6	2005	0.0289	0.1165	0.0993	0.4189	0.0489	0.5595	0.126	0.099
UB	6	2006	0.0329	0.143	0.035242	0.3814	0.0418	0.4861	0.115	0.116
UB	6	2007	0.0338	0.1904	0.045904	0.4276	0.0582	0.4919	0.118	0.172
UB	6	2008	0.0335	0.1722	0.039757	0.4197	0.0582	0.5671	0.112	0.303
UB	6	2009	0.0237	0.1316	0.046224	0.4809	0.0569	0.6874	0.1	0.242

UB	6	2010	0.0331	0.1209	0.037634	0.3905	0.0561	0.6931	0.106	0.017
UB	6	2011	0.034	0.1323	0.033509	0.3359	0.0592	0.5868	0.114	0.201
UB	6	2012	0.0361	0.1334	0.015304	0.3577	0.0783	0.4236	0.087	0.335
UB	6	2013	0.0228	0.128	0.025307	0.5356	0.0752	0.2557	0.099	0.049
UB	6	2014	0.0181	0.1442	0.017346	0.5877	0.0864	0.38	0.103	0.11
UB	6	2015	0.0214	0.1285	0.022266	0.6221	0.082	0.2307	0.102	0.064
UB	6	2016	0.0236	0.1292	0.022273	0.6232	0.089	0.2312	0.076	0.095
NIB	7	2003	0.0147	0.1312	0.09275	0.35423	0.0522	0.3729	0.1356	0.089
NIB	7	2004	0.0281	0.1212	0.121215	0.4153	0.0524	0.2973	0.1281	0.102
NIB	7	2005	0.0266	0.1293	0.1234	0.4054	0.0521	0.3794	0.126	0.099
NIB	7	2006	0.0309	0.1516	0.084746	0.3672	0.0502	0.2996	0.115	0.116
NIB	7	2007	0.0328	0.1834	0.055586	0.3614	0.0578	0.3704	0.118	0.172
NIB	7	2008	0.0361	0.1912	0.067296	0.3758	0.0699	0.5396	0.112	0.303
NIB	7	2009	0.0363	0.1724	0.111571	0.3748	0.0804	0.7082	0.1	0.242
NIB	7	2010	0.0373	0.1701	0.073668	0.3889	0.0693	0.7434	0.106	0.017
NIB	7	2011	0.0377	0.179	0.05043	0.3595	0.0772	0.7066	0.114	0.201
NIB	7	2012	0.0372	0.1986	0.024743	0.3589	0.076	0.5106	0.087	0.335
NIB	7	2013	0.0344	0.1913	0.037877	0.4121	0.0849	0.3388	0.099	0.049
NIB	7	2014	0.0299	0.1975	0.030794	0.4136	0.0698	0.2418	0.103	0.11
NIB	7	2015	0.0281	0.1814	0.0395	0.5147	0.0839	0.1839	0.102	0.064
NIB	7	2016	0.0286	0.1823	0.0399	0.5149	0.0845	0.1842	0.076	0.095

Appendix VI

List of Commercial Bank Operated In Ethiopia

No	Bank Name	Establishment Year
1	Commercial Bank Of Ethiopia	1974
2	Awash International Bank	1994
3	Dashen Bank	1995
4	Abyssinia Bank	1996
5	Wogagen Bank	1997
6	United Bank	1998
7	Nib International Bank	1999
8	Cooperative Bank of Oromia	2004
9	Lion International Bank	2006
10	Oromia International Bank	2008
11	Zemen Bank	2008
12	Bunna International Bank	2009
13	Birhan International Bank	2009
14	Abay Bank	2010
15	Addis International Bank	2011
16	Debub Global Bank	2012
17	Enat Bank	2012

Source: www.nbe.gov.et

