



ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
MASTER OF BUSINESS ADMINISTRATION

**DETERMINANTS OF BANK LENDING RATES: EMPIRICAL STUDY ON
COMMERCIAL BANKS IN ETHIOPIA**

**Presented in Partial Fulfillment of the Requirements for the Degree of
Master of Business Administration in Finance**

By: Habtamu Amsalu Tilahun

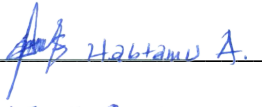
Advisor: Sewale Abate (Ph.D.)

March 2019
Addis Ababa, Ethiopia

Statement of Declaration

I, the undersigned, declare that this thesis entitled: *Determinants of Bank Lending Rates: Empirical Study on Commercial Banks in Ethiopia*; is my original work, prepared under the guidance of my advisor Sewale Abate (PhD). All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

Name: **Habtamu Amsalu Tilahun**

Signature  Habtamu A.

Date 15-03-2019

March 2019
Addis Ababa University
Addis Ababa, Ethiopia


Statement of Certification

This is to certify that Habtamu Amsalu Tilahun has carried out his research work on the topic entitled “*Determinants of Bank Lending Rates: Empirical Study on Commercial Banks in Ethiopia*”. The work is original in nature and is suitable for submission for the award of the Degree of Master of Business Administration in Finance at the Addis Ababa University.

Advisor:

Name: **Sewale Abate (PhD)**

Signature 


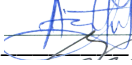

Date 

ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
MASTER OF BUSINESS ADMINISTRATION

Declaration

This is to certify that the thesis prepared by **Habtamu Amsalu Tilahun**, entitled: “*Determinants of Bank Lending Rates: Empirical Study on Commercial Banks in Ethiopia*” and submitted in partial fulfillment of the requirements for the degree of Master of Business Administration in Finance complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

Approved by:

| | | |
|----------------------------|--------------------------|---|
| ✓ <i>External Examiner</i> | <u>Demessie D. (PhD)</u> | Signature  Date <u>15/03/2019</u> |
| ✓ <i>Internal Examiner</i> | <u>Abebaw K. (PhD)</u> | Signature  Date <u>15/03/2019</u> |
| ✓ <i>Advisor</i> | <u>Sewale A. (PhD)</u> | Signature  Date <u>15/03/2019</u> |

Abstract

This study investigates and analyzes bank-specific variables and external determinant factors of lending rates of commercial banks' in Ethiopia. Seven factors (five bank specific and two macroeconomic factors) affecting banks lending rate were identified and analyzed. Internal factors selected under this study consists of several aspects such as operating expenses, deposit rate, non-interest income, liquidity and asset size, while external variables included are GDP and inflation. Thirteen commercial banks have been the subject for the study ranging from the period 2010 to 2017. A quantitative research approach and explanatory design were adopted in carrying out this research. The study had employed panel data estimation techniques to analyze the influence of bank specific and macroeconomic factors on lending rate. The random effect panel regression technique was applied to estimate the model using the econometric software package EViews 9. The results indicate that lending rates are significantly impacted by variables associated with higher cost structures or lower income. The results of balanced random effect panel data regression analysis showed that operating costs, deposit rate, liquidity, asset size and GDP have a positive and statistically significant relationship with lending rate. On the other hand, non-interest income has negative and statistically significant effect on lending rate, suggesting that variable that help improve bank's income tend to benefit borrowers by lowering the interest they pay. The findings of the study also showed negative and significant relationship among inflation and lending rate of Ethiopian commercial banks. The findings of this study indicated that bank policies that reduce bank costs and strategies that improve bank's non-interest income will help to lower the cost of borrowing.

Keywords: *Lending Rate, Determinants of Lending Rate, Loans and advances, Ethiopian Commercial Banks*

Acknowledgment

First and for most, I would like to thank the Almighty God who initiates me to begin and helped me to finish this thesis work.

Secondly, I would like to express my genuine gratitude to my advisor, Sewale Abate (Assistant Professor) for his unreserved assistance in giving me relevant comments, advice and guidance throughout the study.

Thirdly, my grateful thank goes to my family and my wife Eden T/Haimanot for their continuous moral and spiritual support towards my education this far. Their sacrifices and opportunities accorded to me have enabled me come this far.

Finally I would like to express my gratitude to NBE change management directors and bank supervision department staffs, for their assistance by giving audited financial reports of all commercial banks. Besides, my thanks also goes to all my friends and colleagues specially Abaynew Demisew who provided me all the necessary assistance when doing my thesis.

Table of Contents

Statement of Declaration..... ii

Statement of Certification iii

Declaration..... iv

Abstract..... v

Acronyms x

List of Tables xi

List of Figures xii

CHAPTER ONE 1

1. INTRODUCTION 1

 1.1 Background of Study 1

 1.2 Statement of the Problem..... 3

 1.3 Objective of the Study..... 7

 1.3.1 General Objective 7

 1.3.2 Specific Objectives 7

 1.4 Research Hypothesis 7

 1.5 Significance of Study 8

 1.6 Scope of the Study 8

 1.7 Limitation of the Study 9

 1.8 Research Methodology 9

 1.9 Organization of the Study 10

CHAPTER TWO 11

2. REVIEW OF RELATED LITERATURE 11

 2.1 The Concept of Bank Lending Rate..... 11

 2.2 Theories of Interest Rate Determination 12

 2.2.1 The Classical Theory of Interest Rates 13

 2.2.2 The Loanable Funds Theory of Interest Rates 13

 2.2.3 Keynesians Liquidity Preference Theory of Interest Rates..... 14

 2.2.4 The Rational Expectations Theory of Interest Rates..... 15

 2.2.5 Loan Pricing Theory 16

 2.3 Bank Lending Rate Determinants 16

 2.3.1 Bank Specific Variables..... 17

 2.3.2 Macroeconomic Variables Environment..... 20

| | | |
|---------------------|---|----|
| 2.4 | Empirical review of related studies..... | 23 |
| 2.5 | Conceptual Framework..... | 29 |
| 2.6 | Summary and Knowledge Gap | 30 |
| CHAPTER THREE | | 31 |
| 3. | RESEARCH DESIGN AND METHODOLOGY | 31 |
| 3.1 | Research approach adopted..... | 31 |
| 3.2 | Population Size and Sampling Procedure | 32 |
| 3.3 | Data collection, Presentation and Analysis Techniques | 34 |
| 3.3.1 | Data and Data Collection Instruments | 34 |
| 3.3.2 | Data Presentation and Analysis..... | 34 |
| 3.4 | Variable Description, Measurement and Hypotheses of the Study..... | 35 |
| 3.4.1 | Dependent Variable..... | 35 |
| 3.4.2 | Independent Variables..... | 36 |
| 3.5 | Model Specification | 43 |
| 3.6 | Summary | 44 |
| CHAPTER FOUR..... | | 45 |
| 4. | DATA PRESENTATION AND ANALYSIS | 45 |
| 4.1 | Introduction..... | 45 |
| 4.2 | Descriptive Statistics Analysis..... | 45 |
| 4.3 | Trend Analysis of Research Variables..... | 47 |
| 4.3.1 | Trend Analysis of Lending Rate | 47 |
| 4.3.2 | Trend Analysis of Independent Variables..... | 48 |
| 4.4 | Correlation Analysis | 51 |
| 4.5 | Testing Assumptions of Classical Linear Regression Model (CLRM)..... | 52 |
| 4.5.1 | Normality Test | 52 |
| 4.5.2 | Test for Multi-co linearity..... | 53 |
| 4.5.3 | Hetroscedasticity Test | 55 |
| 4.5.4 | Autocorrelation Test | 55 |
| 4.5.5 | Test for weather average value of the error term is Zero | 57 |
| 4.6 | Test for Model Specification: Ramsey RESET Tests | 58 |
| 4.7 | Model Selection: Choosing Random Effect versus Fixed Effect Models..... | 58 |
| 4.8 | Results of Regression Analysis and Interpretation | 59 |
| 4.8.1 | Results of Regression Analysis..... | 59 |

| | | |
|---|---|----|
| 4.8.2 | Interpretation of R-Squared, Adjusted R-Squared and F-Statistic | 61 |
| 4.8.3 | Interpretation of Regression Results | 62 |
| 4.9 | Summary | 67 |
| CHAPTER FIVE | | 69 |
| 5. | SUMMARY OF FINDINGS, CONCLUSIONS & RECOMMENDATIONS | 69 |
| 5.1 | Introduction | 69 |
| 5.2 | Summary of Findings of the Study | 69 |
| 5.3 | Conclusions | 70 |
| 5.4 | Recommendations | 72 |
| 5.5 | Suggestions for Further Studies | 73 |
| References | | 74 |
| Appendix I: Raw Data | | 79 |
| Appendix II Regression Results | | 83 |
| Appendix III Heteroskedasticity Test: White | | 84 |
| Appendix IV: Normality Test | | 85 |
| Appendix V: Breusch-Godfrey Serial Correlation LM Test: | | 86 |
| Appendix VI: Hausman Test | | 87 |
| Appendix VII: Ramsey RESET Test | | 88 |
| Appendix VIII: List of Commercial Banks in Ethiopia | | 89 |

Acronyms

| | |
|-------|--|
| AWB | Awash Bank S.C |
| BEB | Berhan International Bank S.C |
| BLUE | Best Linear Unbiased Estimator |
| BOA | Bank of Abyssinia S.C |
| BUIB | Bunna International Bank S.C |
| CAR | Capital Adequacy Ratio |
| CBE | Commercial Bank of Ethiopia |
| CBO | Cooperative Bank of Oromia S.C |
| CLRM | Classical Linear Regression Model |
| DB | Dashen Bank S.C |
| DW | Durbin-Watson |
| FEM | Fixed Effect Model |
| GDP | Gross Domestic Product |
| INF | Inflation |
| JB | Jarque-Bera |
| LIB | Lion International Bank S.C |
| LIQ | Liquidity Ratio |
| MoFEC | Ministry of Finance and Economic Cooperation |
| NBE | National Bank of Ethiopia |
| NIB | Nib International Bank S.C |
| NPL | Non Performing Loans |
| OPE | Operating Expense |
| OIB | Oromia International Bank S.C |
| OLS | Ordinary Least Square |
| REM | Random Effect Model |
| ROA | Return on Assets |
| UB | United Bank S.C |
| WB | Wegagen Bank S.C |
| ZB | Zemen Bank S.C |

List of Tables

| | |
|--|----|
| Table 3.1: Description of the variables and their expected relationship..... | 42 |
| Table 4.1: Summary of descriptive statistics for study variables..... | 46 |
| Table 4.2: Correlation Matrix (With Dependent Variable)..... | 52 |
| Table 4.3: Normality Test..... | 53 |
| Table 4.4: Correlation Matrix (Only Independent Variables)..... | 54 |
| Table 4.5: Heteroscedasticity Test: White (Summary) | 55 |
| Table 4.6: Breusch-Godfrey Serial Correlation LM Test (Summary)..... | 57 |
| Table 4.7: Ramsey RESET Test (Summary)..... | 58 |
| Table 4.8: Hausman Test (Summary)..... | 59 |
| Table 4.9: Results of random effect regression model..... | 60 |
| Table 4.10: Summary of actual & expected signs of explanatory variables..... | 68 |

List of Figures

Figure 2.1- The schematic conceptual framework..... 29

Figure 4.1- Average trend analysis of Lending Rate..... 47

Figure 4.2- Relationship between lending rate & operating expenses..... 48

Figure 4.3- Relationship between lending rate and deposit rate..... 48

Figure 4.4- Relationship between lending rate and non-interest income..... 49

Figure 4.5- Relationship between lending rate and liquidity of banks..... 49

Figure 4.6- Relationship between lending rate and asset size of banks..... 50

Figure 4.7- Relationship between lending rate and economic growth..... 50

Figure 4.8- Relationship between lending rate and inflation rate..... 51

Figure 4.9- Rejection and Non-Rejection Regions for DW Test 56

CHAPTER ONE

1. INTRODUCTION

1.1 Background of Study

The business of banking involves mobilizations of deposits from surplus units and lending it to deficit units of an economy. Commercial banks play a fundamental role in the economy by undertaking intermediation functions. Banking as a business involves receiving funds from the public by accepting demand, time and saving deposits or borrowing from the public or other banks, and using such funds in whole or in part for granting loans, advances and credit facilities and for investing funds by other means. Thus, banks facilitate the savings and capital formation in the economy (Chirwa, 2001).

Moreover, the banking industry is the critical component of the financial system in developing countries capable of facilitating capital accumulation and economic processes. This is possible through financial intermediation. The banks mobilize funds from surplus spending units in order to bring financial costs down. Banks mostly transform liquid assets like deposits in to illiquid assets like loans (Diamond and Rajan, 2005).

Among the functions of a modern bank, lending is one of the most important activities. Bank loan is typically the largest asset and the predominant source of income for banks. It is evident that a substantial proportion of the total revenue of all commercial banks comes from interest on loans and advances. Loans and advances comprise a very large portion of bank's total assets and they also form one of the most essential operations of a bank. Banks accept customer deposits and they use the funds to grant loans to borrowers or invest in other assets that will yield a return higher than the amount that bank pays to the depositors (Mac Carthy, 2010).

According to Adedoyin and Sobodun (1995), 'lending is undoubtedly the heart of banking business. Therefore, its administration requires considerable skill and dexterity on part of the bank management'. While a bank is irrevocably committed to pay interest on deposits it mobilized from different sources, the ability to articulate loanable avenues where deposit funds could be placed to generate reasonable income; maintain liquidity and ensure safety requires a high degree of pragmatic policy formulation and application.

Credit creation is the main income generating activity of banks. The loan portfolio is typically the largest asset and the predominate source of revenue of banks (Achou and Tenguh, 2008).

Loans are the dominant assets and represent 50 to 75 percent of total assets at most banks, generate the largest share of operating income and represent the banks greater risk exposure (Mac Donald and Koch, 2006). Lending interest rate is among the most important variables affecting lending decision and profitability of commercial banks. In the allocation of funds to earn from the loan portfolio, the primary objective of bank management is to earn income while serving the credit needs of the customers.

When banks mobilize deposit from customers, they pay interest on these deposits to ensure that deposits do not lose value over the period that the money is kept with the bank. The interest on deposits is termed borrowing rate in recognition of the fact that deposits are invariably a way of the bank borrowing from the public (customers). At the other end, when banks lend money to customers, interest is charged on it for a number of reasons, including value preservation, compensation for risk, profit among others. This interest is referred to as bank lending rate. Bank loan interest rate setting determines profitability from their core business and ultimately impacts on the stability of their financial basis through their accumulation of capital. Therefore, one of the most important decisions made by commercial banks is setting lending interest rates that are charged on loans and advances (Kitamura, Muto, Takei, 2015).

Commercial banks can increase their profit margins through higher lending rates and lower deposit rates. However, identifying the right factors that determine the level of commercial banks lending rate and setting appropriate lending rates is not an easy task in banking industry. To maximize the profit of the banks on the one hand and to make loan price fair and competitive on the other, the interest rates that commercial banks charge on loans and advances and its determinants should take due attention.

Thompson (2006) asserts that banks may well set their lending rate according to a certain “mark-up” relative to the deposit rate. Accordingly, one of the important factors determining lending interest rate may be considered as the cost of funding, which is a function of the composition of liabilities and the costs of raising the different liabilities. Likely, there are also other factors affecting price of loans which may include pricing of different types of risks (such

as credit risks associated with the loan and the liquidity risk involved in funding long-term assets with short-term liabilities), operating costs and external variables like inflation and economic growth.

As per the Pan African bank report Dec 30, 2014, the Ethiopian banking industry constitutes the most important element of the Ethiopian financial service sector because it accounts for nearly 80 percent assets of financial service industry. As banks act as the main players in channeling funds from lenders to borrowers, it is important that their intermediary role is carried out with the lowest possible costs in order to encourage investment and to achieve higher social welfare. After financial sector reform NBE impose control over deposit rates in order to keep the lending rates low i.e. set the minimum saving deposit interest rate and leaving lending rate to commercial banks with the aim of improving efficiency in the intermediation process by reducing the interest rate margin. However, this seems not to have been realized in Ethiopia since 2002 (Kozo et al., 2007). Therefore, lending rate in Ethiopia is also not yet set based on demand and supply forces (Sime et al., 2013)

Therefore, this study aims at investigating the internal and external factors that determine bank lending rates in Ethiopia, essential determining tool in allocation of resources in the economy and thus for acceleration and sustainability of economic growth.

1.2 Statement of the Problem

Interest is one of the most important terms in the lending decision process of commercial banks. Commercial banks are independent business entities that set their own lending rates. The lending interest rate is the percentage of the loan amount that the lender charges to lend money. When banks lend money to customers, interest is charged on it for a number of reasons including value of preservation, compensation for risk and profits among others. While the necessity of charging interest on credit has been widely accepted, there seems to be plenty of disagreement over the level of interest rate charged by financial providers because the factors that go into these calculations are not well known. This poses a problem of ascertaining what determines interest rates set by financial intermediaries. It is widely suggested that cost of funds of financial institutions, operating expenses, contingent reserves (provision for bad loans) are among some of the determinants of interest rates set by the financial institutions. Others suggest that tax expense,

profits earned by banks, inflation rates and competition are some of the variables that determine interest rates set by financial institutions. (Sheriff and Amoako, 2014).

Commercial banks have to be careful with their pricing decisions as regards to lending as banks cannot charge loan rates that are too low because the revenue from the interest income will not be enough to cover the cost of deposits, general expenses and the loss of revenue from some borrowers that do not pay. On the other hand, they cannot charge too high loan rates because they will not be able to keep the banking relationship with the borrowers with high lending rate. High lending rates make the cost of funds increasingly prohibitive to potential borrowers and therefore, restrain investments. Additionally, charging too high loan rates may also create an adverse selection situation and moral hazard problems for the borrowers. Thus, determination of the appropriate lending rate is a major issue in banking industry (Chodechai, 2004).

Lending interest rate of commercial banks may be influenced by a number of factors. The classical theory argues that the rate of interest is determined by two forces. Firstly the supplies of savings, derived mainly from households, and second the demand for investable capital coming from the business sector (Rose, 2003). Moreover, the loanable funds theory considers the rate of interest as the function of savings, investment, the desire to hoard money and supply of money.

The empirical studies suggest that; determinants of bank lending rates are numerous and vary across countries and regions (Hassen, 2012). Some studies argue that, the main determinants of financial bank lending rates are bank-specific factors, whereas others claim that the industry-specific factors are more important. On the other hand, others believe that the macro-economic variables are the most important factors that explain the cost of lending. Thus, there is a continuous debate among scholars on the key determinants of commercial bank's lending interest rates in a given country.

The study made by Mbaio et al. (2014), on the title 'Determinants of Bank Lending Rates in Zambia'; found positive significant effect of deposit rate, capital adequacy and statutory reserve ratio on lending rates. The authors have employed panel regression techniques using detailed bank-specific data that reflect a wide range of cost and income determinants for banks. According to this study, bank lending rates are significantly impacted by variables associated with higher cost structures or lower income. This suggests that, increases in bank costs tend to be

passed on to borrowers in the form of higher lending rates, and variables that help improve bank's income also tend to benefit borrowers by lowering the interest rates they pay.

Similarly, the study by Yuga Raj Bhattarai (2015), on the research title 'Determinants of Lending interest rates in Nepalese commercial banks' concluded that operating costs to total assets ratio, profitability and default risk are the major determinants of commercial banks' lending rate in that country's context. According to this study, deposit rate has negligible impact on lending interest rate.

Another study made in India by Jugnu Ansari (2015), had investigated determinants of lending rate under the study title 'Determinants of Commercial Banks' Loan Pricing'. The results of the study had found that, loan interest rates and their spreads showed statistically significant positive relationship with bank-specific factors such as; operating costs, profitability, capital adequacy, loan maturity, product diversification measured by the non-interest income, asset quality, bank size and liquidity indicators. Macro variables such as GDP growth and inflation rate showed positive impact on loan pricing decisions.

This shows that, there are no universally accepted findings about the determinants of bank lending rate. This is because countries are different in their economic systems, political systems, financial systems and operating environments.

The financial service sector in Ethiopia, like most developing countries, is dominated by banking industry. Prior to financial reforms of 1994's, the Ethiopian financial service sector was heavily controlled under the regime of administrative controls, thus financial system remained underdeveloped and repressed.

Since 1994, following financial reforms in Ethiopia, the interest rate of Ethiopian banking industry has been fairly liberalized and the National Bank of Ethiopia (NBE) has set a floor for deposit rate, leaving other rates to be determined by the market. As result, Ethiopian Commercial Banks are setting different lending rates even though they are operating under the same economic environment and subject to the same regulatory environment. It is also evident that, substantial proportion of total revenue of commercial banks in Ethiopia comes from interest on loans and advances. Thus, to boost their profit, banks try to charge higher lending rates thereby

maximize the interest margin, in consideration of internal and external factors like cost of fund, risks embedded, competition, inflation, GDP growth etc.

Lower lending rates in an economy help businesses to grow. This is because firms can easily access funds to expand their business at a cheaper rate. Individuals can also access funds for mortgages and other personal development. However, the lending rates in Ethiopia are relatively high as evidenced from the margins held by banks, thus limiting access to capital and inhibiting economic growth. Economists and academics argue that high interest rates are a barrier to economic development. High lending rates scare borrowers because borrowing at a high rate will be difficult for them to settle their obligation. The situation leaves the small scale businesses and general borrowers finding it difficult to access credit facilities to enable them grow. Until now, the factors that determine lending interest rates of banks in Ethiopia were analyzed with economic intuition, through expert opinions and by analyzing dynamics of certain categories, which are usually considered to influence interest rate policy of banks. To the knowledge of researcher, there is no empirical study focusing specifically on the determinants of lending rates of commercial banks in Ethiopia. This study, therefore, seeks to fill the gap by investigating the factors that could have influence on commercial bank's lending rate.

Therefore, the main purpose of this study is to analyze the financial data of Ethiopian commercial banks, annual reports of NBE and Ministry of Finance and Economic Cooperation (MOFEC) for fiscal year from 2010 to 2017 in order to investigate the determinants of bank's lending rate proxied average lending interest rate and analyze their significance and impact on dependent variable by categorizing the variables in to internal bank specific factors and external macroeconomic variables.

More specifically, the study seeks for finding answers to questions of; why some commercial banks are able to give lower lending rates even though they operate under the same economic environment and subject to the same regulatory environment?

1.3 Objective of the Study

1.3.1 General Objective

The general objective of this study is to identify the determinants of bank's lending rate in Ethiopian commercial banks.

1.3.2 Specific Objectives

- ✓ To identify and analyze the impact of internal bank specific factors on lending rates of Ethiopian Commercial Banks.
- ✓ To determine the effect of external macroeconomic factors on lending rates of Ethiopian Commercial Banks.

1.4 Research Hypothesis

Based on theories and past empirical literatures, the following seven research hypotheses stated in alternative form have been tested in the case of Ethiopian commercial banks for investigation.

- **H1:** Operating Expense has positive and significant impact on Ethiopian Commercial Bank's Lending Rate.
- **H2:** Deposit Rate has positive and significant impact on Ethiopian Commercial Bank's Lending Rate.
- **H3:** Non-interest income has negative and significant impact on Ethiopian Commercial Bank's Lending Rate.
- **H4:** Bank's Liquidity has positive and significant impact on Ethiopian Commercial Bank's Lending Rate.
- **H5:** Total asset size of banks has negative and significant impact on Ethiopian Commercial Bank's Lending Rate.
- **H6:** Gross Domestic Product (GDP) has positive and significant impact on Ethiopian Commercial Bank's Lending Rate.
- **H7:** Inflation has positive and significant impact on Ethiopian Commercial Bank's Lending Rate.

1.5 Significance of Study

The findings of this study may provide a significance to different stakeholders as it aims in identifying factors that determine commercial banks lending rates. The findings mainly benefit commercial banks, bank managers, shareholders, regulators and scholars.

- *To Commercial Banks:* the study assists commercial banks to set and follow reasonable loan pricing.
- *To Managers:* The study helps management of banks to make them aware and to give due attention about the variables that affect lending interest rate.
- *To the shareholders:* The study would assist to increase their knowledge by providing helpful information on deciding loan prices or focus to boost their overall wealth.
- *To the regulator:* The study is also be helpful in providing adequate information for the regulatory body of financial service industry (NBE) to make informed decisions in policy making.
- *To the scholars:* Furthermore, the study adds a knowhow to existing body of knowledge on the determinants of commercial bank's lending rate. Thus, it serves as starting point for further studies by providing valuable and suggestive information on area under study. The study would be a source empirical reference which would provide a ground for further researches.

1.6 Scope of the Study

This study is confined in identifying the determinants of lending rates of commercial banks registered by NBE within the limits of specified time. Even though, there are sixteen private and one public owned commercial bank in Ethiopia, the study selected thirteen commercial banks namely Commercial Bank of Ethiopia, Awash Bank S.C, Dashen Bank S.C, Bank of Abyssinia S.C, Wegagen Bank S.C, United Bank S.C, Nib International Bank S.C, Cooperative Bank of Oromia, Lion International Bank S.C, Oromia International Bank S.C, Zemen Bank S.C, Berhan International Bank and Bunna International Bank S.C that have at least eight years of experience. The researcher has chosen the sample because these banks have good experience in the banking operation and play a major role in determination of lending interest rate in the entire research period. Further the study period covers only from 2009/10 up to 2016/17 accounting years of the sampled commercial banks.

1.7 Limitation of the Study

While doing this research, the researcher may face various problems. Among the problems, the access of data because of confidentiality, it wouldn't easy to get all relevant information from respective banks. The study uses quantitative approach and only secondary data. As a result, the study lacks rich qualitative data that triangulate and further explain the quantitative findings. Furthermore, the study is limited to only thirteen commercial banks that have at least eight years of experience, though it will be more productive, comprehensive and result in better findings and solutions if the study includes all the commercial banks operating in country.

1.8 Research Methodology

Quantitative method of research approach has used to meet the objective of the study and to test hypotheses under it. According to Creswell (2009), quantitative research approach enables the researcher to test objective theories in real world by constructing the cause and effect relationship between variables and promote the replication of research. In this study, this approach enables to establish how independent variables affect commercial banks lending rate.

Target population of the study was banks that are engaged in commercial activities and registered by National Bank of Ethiopia to act. The study had selected a sample of thirteen commercial banks having at least eight year's experience (i.e. from 2010 to 2017).

The type of data needed for the study is quantitative firm-level and macroeconomic data in which; the firm-level data is obtained from the audited financial statements of selected commercial banks while the macroeconomic variables are obtained from annual reports of National Bank of Ethiopia and from Ministry of Finance and Economic Cooperation.

In order to achieve the objective of the study and to test the proposed hypotheses, the collected data is analyzed by using Eviews 9 software package and correlation analyses between dependent and independent variables are made. Finally, balanced panel random effect regression model was employed including testing of Classical Linear Regression Model (CLRM) assumptions.

1.9 Organization of the Study

The study is organized in to five chapters. Chapter one introduces the study background, giving an overview idea of lending rate and demonstrates the objectives, significance, hypotheses, scope and limitation of the study and the method of research employed. Chapter two reviews literature on both theoretical and empirical studies on the bank lending rates. It contains an assessment of researches done on bank's lending rate and related topics and the variables that influence it. The methodology employed for investigating the quantitative significance of the determinants of bank lending rate is presented in detail in chapter three. Chapter four presents the results of analysis done and discusses the findings made. Chapter five, finally, draws conclusions from empirical findings and suggests recommendations for policy considerations.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

This chapter discusses related theoretical and empirical literatures on lending interest rates and factors that determine commercial bank's lending rate. It reviews information from other researchers that have conducted studies in related field of area and explains methodologies adopted and findings of other researchers. Finally, the chapter establishes a framework for the study and clearly identifies the gap to be researched.

2.1 The Concept of Bank Lending Rate

Interest rate in its base form refers to the amount charged on money borrowed or lent out expressed as a percentage within a period of time, usually one year. It is also sometimes referred to as the cost/price of money given out for a defined period of time. Lending interest rate can be considered the cost incurred on lending money or the compensation for the service and risk of lending money to defer the opportunity of spending in the present. It is also information required for policy making and an operating instrument in monetary policy. In such context, a proper understanding of the determinants of the interest rates and estimating the degree of their impact on interest rates is extremely useful in both public and private financial decision making (Peiris and Jayasinghe, 2015).

The lending interest rate is the cost of loan i.e. the ratio obtained by dividing a commitment fee by the loan amount (Rose, 2003). It is amount charged on money lent out expressed as a percentage within a period of time, usually one year. It is also sometimes referred to as price of money given out for a period of time. Interest rate decreases with the increase of loanable funds in relation to its demand. And, vice versa, it increases as the supply of funds decrease. The interest rate level changes with the changes in inflation expectations and a business cycle. It rises in times of expansion and slows down during economic contraction (Koch, 1995).

H. S. Hendric & P. J. Williamson (1996) suggest that different rates of interest are charged for the same sum of loan for the same period because of the fact that some loans involve more risk, more inconvenience and more incidental work. Thus interest is of two types: pure interest and gross interest. The pure interest is the payment for the use of money as capital when there is neither inconvenience, risk nor any other management problem. The gross interest is the gross

payment which the lender gets from the borrower. It includes not only net interest but also payment for other elements; payment for risk, payment for inconvenience, payment for management and payment for exclusive use of money, i.e. pure interest

- Payment for risk: Every loan, if not secured fully, involves risk of non- payment due to the inability or unwillingness of the borrower to pay back the debt. The lender charges something extra for taking such risk.
- Payment for inconvenience: The lender may add extra charges for the inconvenience caused to creditor. The greater the inconvenience involved, the higher will be such charge and consequently the gross interest. For instance, the borrower may repay at a very inconvenient time to the lender or the borrower may invest the capital for a period longer than the one for which loan has been given.
- Payment for management: The lender expects to be compensated for the additional work done in connection with lending e.g., the form of keeping accounts, sending notices and reminders and other incidental work.
- Payment for exclusive use of money, i.e. pure interest: It is the payment for the use of money which is in addition to payments for the above- mentioned risks, inconvenience and management.

In short, gross interest is the total payment which the lender gets from the borrower, whereas, net interest is just one part of gross interest which is paid exclusively for the use of capital.

2.2 Theories of Interest Rate Determination

Lending interest rates are primarily determined by factors affecting loan supply and demand. Loan interest rate depends on total deposits and other sources of bank funds, the cost of their acquisition and risks to which banks are exposed in their lending activities. They also depend on regulation cost, bank's operating costs and the fee paid to owners for the capital invested i.e. the profit margin. Each of the above specified elements depends on the effect of various factors. Loan demand depends on the very interest rate. However, it also depends on the expectation regarding economic activities and price trends, which are also a subject of various impacts. Therefore, the examination of the active lending interest rates must start from the fact that they are affected by numerous factors. It is not easy to group them as a whole, even in theory, in light of numerous various interdependencies of their effects (Branko Krnic, 2014).

A number of theoretical frameworks have been developed to explain what determines interest rates in an economy. According to classical theory, the real rate of interest is determined by the marginal productivity of physical capital. This basic notion has been extended to include other influences with the time preference theory, the liquidity preference (or cash balances) theory, the loanable funds theory, and the rational expectations theory.

The following are some of the theories that the researcher has identified as relevant to the area of research under the consideration.

2.2.1 The Classical Theory of Interest Rates

Interest, in real terms, is the reward for productive use of capital, which is equal to the marginal productivity of physical capital. In a money economy, however, as physical capital is purchased with monetary funds, the rate of interest is determined by the marginal productivity of physical capital.

According to Keynes, true classical theory of interest rate is the savings investment theory. Basically, the theory holds the proposition based on the general equilibrium theory that the rate of interest is determined by the intersection of the demand for and supply of capital.

Caplan (2000) argued that an equilibrium rate of interest rate is determined at a point at which the demand for capital equals its supply. Demand for capital stems from investment decisions of the entrepreneur class while the supply of capital results from savings of the community. Thus, investment demand schedule reflects the demand for capital, whereas saving schedule represents the supply of capital. It follows that savings and investment are the two real factors determining the rate of interest (Friedman and Kuttner, 1991).

2.2.2 The Loanable Funds Theory of Interest Rates

According to this theory, the supply and demand of loanable funds or excess bank reserve is the main determinant of interest rates. Saving is the supply of loanable funds- households lend their savings to investors or deposit their saving in a bank that loans the funds out. Investment is the demand for loanable funds-investors borrow from the public directly by selling bonds or indirectly by borrowing from banks. Because, investment depends on the interest rate, the quantity of loanable funds demanded also depends on the interest rate. In the situations where the

demands for loan exceed the supply of loans, interest rates will rise in the favor of banks and to the disadvantage of borrowers.

This theory has built upon the classical theory of interest rate by recognizing the fact that money supply significantly influences saving and investment. The theory has incorporated monetary factors with non-monetary factors of savings and investments. According to the theory, the rate of interest is determined by demand and supply of funds in economy at the level where the two (demand and supply) are equated. Thus, it is standard demand and supply theory as pragmatic to the market for loanable funds, handling the interest rate as price (per unit time) of such funds. The theory is centered on the given simplifying assumptions: the market for loanable funds is one fully integrated (and not segmented) market, characterized by perfect mobility of funds throughout the market.

Loanable funds theory has implication on bankers', savers and borrowers. According to this theory, this group should be well compensated at the equilibrium. Interest rate on loan should be structured in a way that every party feels comfortable.

The interest rate adjusts until the amount that firms want to invest equals the amount that households want to save. If the interest rate is too low, investors want more of the economy's output than households want to save. Equivalently, the quantity of loanable funds demanded exceeds the quantity supplied. When this happens, the interest rate rises. Conversely, if the interest rate is too high, households want to save more than firms want to invest; because the quantity of loanable funds supplied is greater than the quantity demanded, the interest rate falls. At the equilibrium interest rate, households' desire to save balance the firms' desire to invest and the quantity of loanable funds supplied equals the quantity demanded (Mankiw, 2001).

2.2.3 Keynesians Liquidity Preference Theory of Interest Rates

The liquidity preference approach views interest rates from the supply and demand of the stock of money in the financial system. The concept was first developed by Keynes (1936) where he stated that the demand for money is expressed as a function of level of income and interest rate. $MD = (Y, r)$ where; MD is Money demanded: Y is level of income and r is interest rate. This framework holds that, the interest rate is determined by the interaction of supply and demand of money stock. According to Keynes (1936), money is demanded mainly for the following

motives; transaction, precautionary and speculative motive and interest is reward for parting with liquidity for specified period.

Liquidity preference is the decision about the degree of liquidity at which savings should be held. Furthermore, it is a decision concerning the stock of savings –wealth-at any point in time, rather than any new flow of saving alone. The rate of interest hence is not determined by the supply of and demand for (flows of) savings, but by the supply of and demand for assets into which holdings of (stocks of) wealth can be placed. In the theory of money as a store of value, money is one of these assets.

The current rate of interest depends not only on the strength of the desire to hold wealth, but on the strengths of the desire to hold it in liquid and illiquid forms respectively, coupled with the amount of the supply of wealth in the one form relatively to the supply of it in the other. In an uncertain world, people seek a degree of liquidity and it is this demand for liquidity that is a major element in the determination of interest rates. This gives us the model with the rate of interest being determined by the demand for money (liquidity preference) and the supply of money.

2.2.4 The Rational Expectations Theory of Interest Rates

This theory is based on the idea that people formulate expectations based on all the information that is available in the market. Rational expectation theory holds that the best estimation for future interest rates is the current spot rate and that changes in interest rates are primarily due to unexpected information or changes in economic factors. This theory can be incorporated with the loanable funds theory in order to better consider the available information within the economy. The limiting factors of rational expectation theory are mostly related to the difficulty in gathering information and understanding how the public uses its information to form its expectations. If expectation of the people is that interest will rise, many people will avoid borrowing this in return will affect bank performance due to reduced earning on interest rate, but if people expect interest rate to drop people would be willing to borrow and this will improve banks performance due to increase in interest rate earning (Bekaert, 1998).

2.2.5 Loan Pricing Theory

Banks cannot always set high interest rates, e.g. trying to earn maximum interest income. Banks should consider the problems of adverse selection and moral hazard since it is very difficult to forecast the type of borrower at the start of banking relationship (Stieglitz and Weiss, 1981). If banks set too high interest rates, they may induce adverse selection problems because high-risk borrowers are willing to accept these high rates. Once these borrowers receive the loans, they may develop moral hazard behavior or so called borrower moral hazard since they are likely to take on highly risky projects or investments. Loan pricing requires that all related costs associated with extending the credit to be known before setting the interest rate and it typically considers cost of funds, operating costs, risk premium for default risk and a reasonable profit margin on capital (Chodechai, 2004). From the reasoning of Stieglitz and Weiss, it is usual that in some cases we may not find that the interest rate set by banks is commensurate with the risk of borrowers. According to loan pricing theory, too high interest rate increases the chance of loan default; consequently it boosts the rate of nonperforming loan.

2.3 Bank Lending Rate Determinants

Lending interest rates are primarily determined by factors affecting loan supply and demand. Loan and its interest rate depends on total deposits and other sources of bank funds, the cost of their acquisition, and risks to which banks are exposed in their lending activities. This rate is normally differentiated according to creditworthiness of borrowers and objectives of financing, the availability of money in the market, tenure of the loan, the type and value of collateral, the economic sector of the loan and on the specific terms of the contract. It is also dependant on the regulation cost, bank's operating costs and the fee paid to owners for the capital invested i.e. the profit margin. Bank lending rate is measured by average interest rate on lending.

The empirical literature indicates that factors that influence interest rate setting by commercial banks can be classified in to two categories: bank-specific factors and broader macroeconomic factors. A wide range of different variables have been identified as important within each of these categories. At the level of individual banks, bank-specific factors such as levels of operating or administrative costs, interest expenses, return on assets, asset size of banks, liquidity in relation to bank assets are among the most important variables.

More specifically, it has been well established that banks tend to, at least or in part, pass on costs associated with higher taxes or non-performing loans (Chodechai, 2004; Chirwa, 2004).

And, unsurprisingly, at the macroeconomic level, variables such as inflation and the pace of economic growth have been found to matter.

According to Mensah and Abor (2014) lending rate of banks is determined by a numbers factors includes, bank specific factors (such as bank specific risk, bank size and efficiency), bank industry characteristics (market structure), regulatory factors (capital adequacy ratio and reserve requirement) and macroeconomic factors (inflation volatility of interest rates and exchange rate). Larger banks as compared to smaller banks are able to offer lower lending rates because their scale of operation earns them economies of scale, and thus they are more likely to offer lower lending rates and higher deposit rates; they also tend to have lower interest margins (Ho and Saunders, 1981).

2.3.1 Bank Specific Variables

2.3.1.1 Operating Expense and Lending Interest Rate

Theory indicates that variation in operating expense is reflected in variation in bank lending interest rate, as banks pass their operating costs to borrowers.

The costs of intermediation (screening, monitoring, branching costs, etc.) have a positive effect on the interest rate on loans. Several studies show that there is a positive relationship between operating expenses and lending interest rate of commercial banks. This is because banks bearing higher average operating expenses may resort to charge higher margins to offset higher operating costs (Maudos & Guevara, 2004 and Carbo & Rodriguez, 2007).

According to Demirguc-Kunt and Huizinga (1998) banks pass their overhead and operating cost to their customers in the form of high interest rate. It has been observed that the high cost of operation is one of the major contributing factors that lead to high cost of funds of commercial banks. Banks that are less efficient in their operation exhibit higher operating costs are characterized by higher interest rate. And for banks to stay in business they must pass this cost to the borrowers in the form of higher lending rate.

Lerner (1981) argued that banks face operating expenses while acting as financial intermediaries. As the total cost of operation increases, the banks' net income is expected to decrease. As a result, it is common for banks to charge higher interest. Even in the absence of market power and risk, a positive margin is necessary to cover the operating costs.

On the other hand, higher operational efficiency may induce banks to pass the lower costs to their customers in the form of lower loan rates. (Samy, 2003) found a positive relationship between overhead cost and lending interest rate of Tunisia banks. (Ahmet & Hakan, 2010) indicated a positive relationship between operating expense and lending interest rate on Turkey banks. The study made by Mbao, Kapembwa, Mooka, Rasmussen and Sichelwe (2014) in Zambia founded that high lending rates are primarily a reflection of high costs of doing business.

The researcher argue that operating costs and lending interest rate are positively related because banks that incur high costs will work with higher lending rates to enable them cover the high costs.

2.3.1.2 Deposit interest rate on lending interest rate

The business of banking is basically one of the financial intermediation involving mobilizations of deposits from surplus units of an economy and lending to deficit units of an economy. When banks mobilize deposit from customers, they pay interest on these deposits to ensure that deposits do not lose value over the period that the money is kept with the bank. The interest on deposits is termed as borrowing rate in recognition of the fact that deposits are invariably a way of the bank borrowing from the public (customers). Uhde and Heimeshoff (2009) argued that short term increases in interest rates to deposit rates increase the banks costs of funds, resulting in the higher interest on loans. It is expressed as a percentage of interest expense to interest bearing deposits. It is obvious that, deposit interest rate positively affects the way banks price their loans.

2.3.1.3 Non-Interest Income and Lending Interest Rate

Non-interest income reflecting product diversification refers to all the income of a commercial bank other than the interest income. Stiroh (2002) classified noninterest income into a heterogeneous category that comprises many different activities, so it is broken down into four primary components – fiduciary income, service charges, trading revenue, and fees and other

income. Fiduciary income is revenue related to the bank's fiduciary operations, e.g., administering investments for others. Service charges include revenue directly related to deposit accounts like ATM or check usage fees. Trading revenue is primarily income from the net gain or loss recognized from trading cash instruments, off-balance contracts, and mark-to-market changes in the carrying value of assets and liabilities. Fees and other income include all other fees, e.g., loan commitment fees, safe deposit boxes, commissions, and land rental fees.

According to the study by Mbaio et al. (2014), banks with improved income source tend to benefit borrowers by lowering the interest rates they pay. Thus, the non-interest income is associated with a negative coefficient. Furthermore, as per the study by Ansari (2015), product diversification measured by the non-interest income variable has a significant negative coefficient on loan pricing of Indian banks suggesting possible cross-subsidization of traditional lending activities. Thus, banks decrease their lending rate when they are more reliant on fee generating products. Based on this, a negative relationship with lending interest rate is hypothesized.

2.3.1.4 Liquidity and Lending Interest Rate

Liquidity is measured by the ratio of liquid assets to total assets. Liquidity is the opportunity cost for bank's profitability. More liquid banks are expected to have higher lending rates in order to compensate for the opportunity costs of holding extra liquidity. Liquidity risk is computed as the ratio of banks liquid assets to total assets. The degree to which banks are exposed to liquidity risk varies across banks (Ahokpossi, 2013).

According to the liquidity preference theory, lenders need high interest rate which includes the liquidity premium in order to lend. The basic idea underlining this theory is that, lenders of funds prefer to lend short, while borrowers generally prefer to borrow long. Hence borrowers are prepared to pay interest rate margin/ a liquidity premium to lenders to induce them to lend long. The size of interest rate/ liquidity premium increases with the time to maturity. Therefore, as they got higher premium, lenders give up their liquid money (Pilbeam 2005). Holding of liquid assets will force banks to reduce their lending size which in turn may increase opportunity cost. Thus, bank liquidity is expected to be positively related to lending interest rate.

2.3.1.5 Bank Size and Lending Interest Rate

Bank size is measured as the logarithm of assets of each bank. There are disagreements on how bank size affects lending interest rate. Theoretically one would expect bigger banks to be associated with lower lending interest rates, arguably because of large economies of scale and ability to invest in technology that would enhance efficiency. (Fungacova & Poghosyan, 2009) argue that due to increased economies to scale, banks that provide more credit should benefit from their size and have lower lending rates.

Some authors suggest a positive relationship between the size of a bank and lending rates. They argue, the larger the average size of the operations, the larger the risks concentrated in single customers and the higher the lending rates (Liebeg & Schwaiger, 2006 and Maudos & Guevara, 2004). Besides, the extent that bank size connotes control of the market in the deposit and loan markets, a positive relationship between lending interest rate and bank size should not be amazing.

2.3.2 Macroeconomic Variables Environment

In addition to the bank specific factors, banks also keep eye on the economic environment when setting their lending rates. The macro determinants are variables that are not related to bank management but reflect the economic and legal environment that affects the operation of institutions. The macroeconomic factors that can affect bank's lending rate include factors such as GDP growth rate and inflation among others.

Macroeconomic conditions have been observed as one of the most important factors that explain the variation of the commercial banks lending rate. A study conducted by Brock and Franken (2003) suggests that macroeconomic condition is the most important determinant source of variation in cost of credit in Ghana. It was also affirmed by Chirwa and Mlachila (2004) that macroeconomic instability and the policy environment in which banks found themselves to be having an important impact on the way commercial banks set their lending rate. Their findings suggest that most important factors of macroeconomic factors that affect the lending rate are inflation, GDP and the money market real interest rate.

Macroeconomic condition also has an impact on the performance of the banking industry by influencing the ability of borrowers to pay their loan. Unstable macroeconomic condition in the country and with poor economic growth affects the return of investment and these lead to high rate of lending rate as the level of non-performing loans increase and the banks must factor these non-performing into the lending rate. Undoubtedly, an unsound macroeconomic and policy situation is perceived as more unsafe and banks may recompense for it by requiring wider margins which lead to high lending rate. Thus, macroeconomic factors such as economic growth and inflation are expected to influence the loan market from demand as well as supply sides.

2.3.2.1 Gross Domestic Product and Lending Interest Rate

This factor captures the market conditions that certainly have an impact on lending interest rate. The interest rate level changes with the changes in business cycle. It rises in times of expansion and a slowdown during the economic contraction (Koch, 1995).

During periods of good economic condition, loan demand tends to be higher, allowing banks to provide more loans. Economic growth is an important variable in the determination of lending interest rate because it affects demand and supply of bank services such as deposits and loans.

There is no consensus on how economic growth affects lending interest rate. Some studies argue that economic growth has a positive effect on interest rate (Claessens et al., 2001), while others find a negative effect (Demirgüç-Kunt & Huizinga, 1999; Demirgüç-Kunt et al., 2004 and Carbo & Rodriguez, 2007).

The study by Gambacorta (2004) explained that the interest rate that banks set on their loan have positive correlation with GDP growth. In a situation where there is an increase in economic condition in a particular country, a project that appears not to be profitable venture become profitable when discounted at the present time. This means that an increase in economic conditions will result in an increase in demand for loan which will lead to high rate on loans. On the other hand, if the economic condition leads to low demand for credit because many people now have money with them will result in low demand for credit will lead to low lending rate. Thus, banks make more loans during periods of economic boom because during such periods, businesses make huge profits, more investment opportunities open, and thus demand for loan (additional funding) increases.

2.3.2.2 Inflation and Lending Interest Rate

Inflation is defined as a loss of purchasing power of a currency which results in a general and sustained increase in prices and it is proxied by the Consumer Price Index (CPI). This variable is an indicator of the cost of doing business in an economy. Inflation is an increase in the general price level and is typically expressed as an annual percentage rate of change. Inflation depreciates the value of money. When inflation increases, banks also increase their cost of credit to keep the space with inflation, which will result in increased lending rate in the country.

Regarding the effect of inflation on the performance of credit institutions, Perry (1992) distinguishes between two situations:

- ✓ The first is when inflation is properly anticipated and interest rates are adjusted so as incomes rise faster than the costs of credit institutions, in this case it will have a positive effect on bank performance.
- ✓ The second situation is when inflation is not properly anticipated and banks are not able to adjust interest rates, in this case the cost of credit institutions exceed the income and inflation will a negative effect on the bank performance.

(Demirgüç-Kunt & Huizinga, 1999) found a positive relationship between inflation and lending interest rate in a study of 80 developed and developing countries. These results are consistent with other studies such as (Claessens et al., 2001) in a study of 80 countries; and (Drakos, 2002) in a study of Greek banks. However, (Abreu & Mendes, 2002) found negative relationship between inflation and interest rate on a cross-country study of Portugal, Spain, France, and Germany. (Maria & Agoraki, 2010) also found a negative relationship between inflation and interest rate on South Eastern Europe countries. (Martinez & Mody, 2004) showed that inflation has a negative impact in Latin-American bank's rate. (Samy, 2003) indicated a negative relation between inflation and interest rate of Tunisia banks. Although there is no empirical consensus on the effects of inflation on interest rate, the researcher argue that high inflation rates are generally associated with high interest rates. Even if inflation is not anticipated by banks, in the short term interest rates may not reflect the increased inflation, but in the medium and long term, banks will adjust their interest rates to compensate for the inflation premium and in so doing increase the lending interest rate.

2.4 Empirical review of related studies

The empirical studies suggest that, determinants of bank lending rates are numerous and vary across countries and regions (Hassen, 2012). Some studies argue that, the main determinants of commercial banks lending rates are bank-specific factors such as operating or administrative costs, non-performing loans, return on assets, structure of the balance sheet, non interest income or non-core revenues, bank size, bank liquidity among others, whereas other studies assert that the industry specific factors such as market concentration or degree of competition, regulatory requirements such as statutory reserve requirements or regulated minimum deposit rates are more important. On the other hand, others claim that macro-economic variables such as real gross domestic product growth rate and inflation rate are the most important factors that explain the price of lending. Some other literatures categorize the determinants of lending rate in to inside (internal) and outside (external) factors. The internal factors are related to the variables that affect the banking sector within while the external factors relate to the legal environment and economic conditions that affect the banking industry from outside. A number of explanatory variables have been projected for both categories, according to the nature and reason of each study.

The empirical research of determinants of lending interest rates are often based on a pure spread approach applied by Ho and Saunders (1981) in the research of determinants of net interest rate margins. According to this approach, the basic function of a bank is to transform savings into loans in a timely manner and consider the interest rate margin a premium which covers thereto related risks, of which the interest rate risk is the most significant. Ho and Saunders (1981) examined determinants of interest rate margins by using the example of the USA banks in the period between 1976 until 1979. They found that the interest rate margins are affected by the management aversion to risk, the size of the transaction, a degree of market competition and the interest rate variability.

Demirguc-Kunt and Huizinga (1999) examined interest spreads in a cross-country set up using data covering commercial banks from 80 countries across the world in the period from 1988 until 1995. The study finds that differences in interest margins and bank profitability are explained by several factors such as bank characteristics, macroeconomic variables, explicit and implicit bank taxation and deposit insurance regulation. According to their findings, interest rate margins and

banking profitability are determined by not only banking specific variables but also macroeconomic conditions, bank taxation, regulation of deposit insurance and the financial structure. By using data from 72 countries in the period from 1995 until 1999, Demirguc-Kunt and Huizinga (2004) again reported that the bank interest rate spread is positively influenced by the ratio of equity to lagged total assets, by the ratio of loans to total assets, by the ratio of overhead costs to total assets, by inflation rate, and by the short-term market interest rate in real terms. The ratio of non-interest earning assets to total assets, on the other hand, is negatively related to the bank interest margin.

The study by Mario Villaplano and Rodolfo Guerrero (2007) have examined the price setting behavior of banks in Mexico under the title ‘Determinants of banking interest rates and bank lending channel in Mexico’. The study had focused on the following variables as the main factors influencing the price setting of banks; i) the degree of efficiency and competition of the banking system, ii) the degree of disintermediation, iii) capitalization and liquidity position of banks and iv) the level of interest rate volatility. To carry out the study, the authors have analyzed the quarterly bank level data base of thirteen banks from 2001 to 2006. The study had concluded that cost of raising resources from the public (deposit interest rate) and bank specific variables such as size, liquidity, capitalization and deposit strength are the main determinants of interest rates of commercial loans.

The study by Georgievska, Kabashi, Trajkovska, Mitreska and Vaskov (2010) has investigated the determinants of lending rates and interest rate spreads in Macedonia under the study title ‘Determinants of lending rates and interest rate spreads in Macedonia’. The authors have used panel estimation techniques on a sample of commercial banks in order to quantify the effect of various factors on lending rates and interest rate spreads during the period running from 2001 to 2009. The results of this study indicated that, lending rates are mostly influenced by bank size and market share and to a somewhat lesser extent by deposit rates and non performing loans. Furthermore, it was also found that a difference between domestic and foreign interest rates had a significant impact as well. A bank size and a market share as well as a difference between domestic and foreign interest rates had an overwhelming effect on interest rate spreads as well, while the effect of other determinants was less clear. In addition, policy variables such as the domestic policy rate and foreign interest rate also appear to be quite important.

The study made in Kenya by Fridah Gatwiri Kinyuru (2011) under the research topic ‘Determinants of lending rate of Commercial Banks in Kenya’, conducted a census survey on 44 commercial banks in Kenya aiming to establish factors determining lending rate. The study has founded that market structure, cost of funds and economic conditions as the main determinants of commercial banks lending rate. The study concluded that cost of fund (loan) is highly determined by taxation costs of provisioning, core liquid asset requirement, transaction costs, central bank supervisory fee, cost of capital (return on equity), the statutory reserve requirement, management fees, staff costs, weighted average deposit rate, reserve requirements, mandatory investment level required by the central bank, inflation conditions, economic growth and foreign exchange rates.

Alidu Uzeru (2012) looked at the determinants of lending rates in Ghana by considering bank specific factors, industry specific factors and macroeconomic variables. The researcher had used panel estimation techniques on a sample of 10 randomly selected Ghanaian commercial banks a period running from 2005 to 2010 in order to identify factors affecting lending rate. The study included stated capital of the individual banks, interest expenses, profitability of the banks, operating expenses, the policy rates set by the central bank, T-bill rates, gross domestic product and inflation. The results of this study indicated that only interest expense was significant in determining lending rates among firm-specific variables. Also, for the industry specific factors that impact lending rates, it was ascertained that the policy rates and the T-bill rates were significant in predicting the lending rates in Ghana. Lending rates was found to increase with increasing policy rate but decrease with increase in T-bill rates. Lending rate was found to increase with increasing interest expense. Finally, for macroeconomic factors that impact lending rates, inflation and gross domestic product were found to impact lending rate with increasing inflation and gross domestic product resulting in increasing lending rates.

The study by Branko Krnic (2014) has identified various internal and external factors affecting lending rates under the research title ‘Determinants of lending interest rates granted to companies in Croatia’. The research paper was focused on gaining an insight into the lending interest rate levels for companies in Croatia and their interconnection with various determinant variables. To do that, the author has made comparison between lending interest rates for companies in Croatia to the rates in countries selected for international comparison. According to the findings of this

study, lending interest rates are strongly positively determined by the rate of inflation, bond yield and deposit interest rates. A medium positive correlation was determined between the interest rates and a share of non-performing loans. A weak negative correlation was defined between interest rates and concentration measures. Accordingly, interest rates were dominantly affected by the cost of banking sources, while the shocks from passive interest rates were not fully transferred into changed loan interest rates. This research revealed that, lending interest rates for companies reacted even more strongly to the cost attack than lending interest rates in the retail sector. The study had also discovered that the lending interest rate margin decreases with the cost increase of banking funding sources and vice versa, while the interest rate margin decrease is additionally significantly affected by cost efficiency and bank asset quality.

The study made by Mbao, et.al (2014), has investigated factors contributing to lending rates in Zambia under their research title ‘Determinants of Bank Lending Rates in Zambia’. Their study has identified a number of variables that have important bearing on lending rates by employing panel regression techniques using detailed bank-specific data that reflect a wide range of cost and income determinants for 11 Zambian banks over the period from January 2005 to September 2013. They have found positive significant effect of deposit rate, capital adequacy and statutory reserve ratio on lending rates. They have also pointed out that, inflation significantly impacts nominal interest rates on almost one-to-one basis. According to the findings of this study, bank lending rates are significantly impacted by variables associated with higher cost structures or lower income. This suggests that, increases in bank costs tend to be passed on to borrowers in the form of higher lending rate, and variables that help improve bank’s income also tend to benefit borrowers by lowering the interest rates they pay. These findings indicate that policies that reduce inflation and bank costs will help lower the cost of borrowing.

The study by Yuga Raj Bhattarai (2015), has examined factors affecting lending rates of Nepalese banks under the study entitled ‘Determinants of lending interest rates in Nepalese Commercial Banks’. The study has used operating cost to total asset ratio, deposit interest rate, profitability (ROA) and default risk as independent variables and bank lending rate as dependent variable. To do that, the study has employed the pooled OLS random effect model by collecting panel data of 6 commercial banks over the period of 2010 to 2015. The result of regression model of the study has revealed that operating cost to total assets ratio and default risk have

significant and positive impact on lending interest rate. Profitability (ROA) has found negative and significant impact on lending interest rate. However, according to this study, deposit rate seems weak in explaining the variation of lending interest rate in Nepalese context.

The study made in India by Jugnu Ansari (2015), had investigated determinants of lending rates under the study title ‘Determinants of Commercial Banks’ Loan Pricing’. Using the dynamic panel data methodology and annual data for a sample of major 33 banks including public, private and foreign banks over the period 1996-2014, the study finds significant impact of various bank specific factors, regulatory and supervisory indicators and macroeconomic factors on the banks’ loan interest rates. Regarding the bank specific variables, loan interest rates and their spreads showed statistically significant positive relationship with operating cost, profitability and capital adequacy, loan maturity, product diversification measured by the non-interest income, asset quality, bank size and liquidity indicators. Macro variables such as GDP growth and inflation rate showed positive impact on loan interest rates. These findings highlight the roles of operating efficiency, risk aversion, asset-liability management, and credit risk management in commercial banks loan pricing decisions.

For Ethiopia, this thesis is to my knowledge the first study that has examined the role bank specific variables and macroeconomic factors in the setting of interest rates on commercial bank lending. In Ethiopia related study conducted by Belay Getachew (2015), has investigated factors that determine costs of financial intermediation under the research title ‘Determinants of costs of financial intermediation on Commercial Banks of Ethiopia’. The researcher has used balanced fixed effect panel regression for the data of sampled 8 commercial banks over the period from 2000 to 2013. The study has selected and analyzed eleven independent variables affecting net interest margin (interest income on loans to total loans minus interest expense on deposits to total deposits). The regression analysis estimated by fixed effect regression model showed that overhead costs, loan loss provisions, capital, asset size, liquidity risk, opportunity cost of reserve, market concentration, market share, economic growth and inflation had as significant effects on net interest margin or financial intermediation cost in Ethiopian banking sector. However, according to this study, return on asset seems insignificant in explaining the variation of lending interest rate.

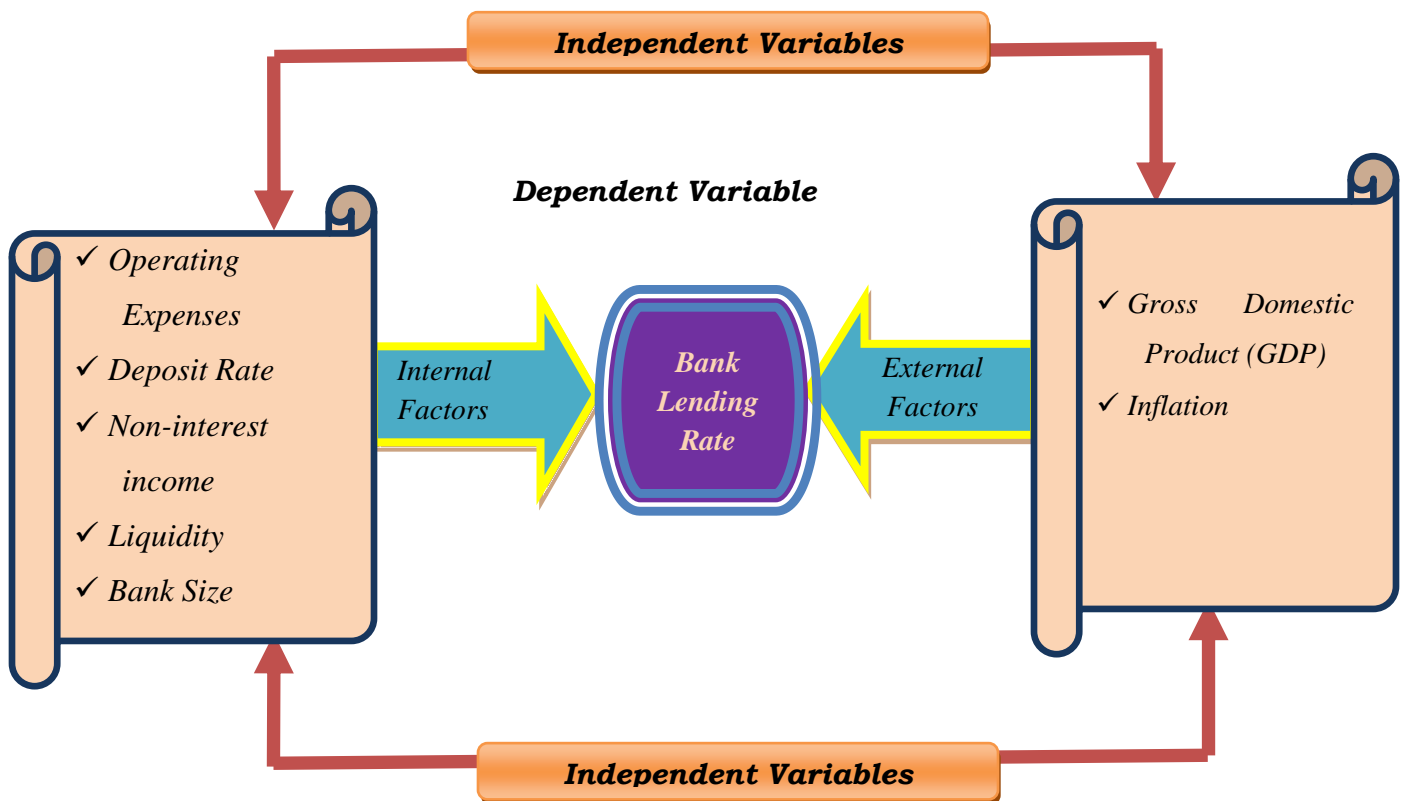
The study made by Meshesha Demie (2016), has examined determinants of net interest margin in the Ethiopian banking sector using a regression model based on consolidated industry data. The study has used data of sixteen commercial banks with more than three years of service in banking industry. The study employed unbalanced panel data model to account the effects of data variation arising from years of service between different banks, and it has examined twelve independent variables which determine net interest margin (interest income minus interest expenses divided by total earning assets). The estimation results of the study revealed that cost efficiency, implicit interest payment, competition and scale efficiency (market share of loan) have positive and significant effect while, management efficiency has negative and significant effect on determination of net interest margin. On the other hand, credit risk, interest rate risk, capital risk, inflation and economic growth do not seem to have significant impact on net interest rate margin.

2.5 Conceptual Framework

The overall objective of this study is to identify and analyze the factors that determine lending rates of commercial banks proxy by average lending rate in Ethiopia using the variables based on various related theories and empirical literatures. Empirical evidences suggest that, bank lending rate is affected by internal and external factors.

Empirical evidences suggest that, bank lending rate is affected by internal and external factors. This study has used both internal and external determinants of banks lending rate jointly which includes; operating expenses, deposit rate, non-interest income, bank liquidity, asset size, Gross Domestic Product (GDP) and inflation. The following conceptual model under figure 2.1 summarizes the main focus and scope of this study in terms of variables included.

Figure 2.1: Schematic Conceptual Framework



Source: Compilation by Researcher

2.6 Summary and Knowledge Gap

The literature reviews that are discussed so far showed that, bank lending rates are determined by internal bank specific factors such as operating or administrative costs, non-interest income, bank liquidity, asset size, among others and external variables such as real GDP growth and inflation.

The empirical studies also suggest that lending interest rate determinants vary across countries and regions. For instance, some of those studies argued that the main determinants of lending interest rate are bank specific factors; whereas others claim that the macroeconomic factors are the most important factors that explain the level of lending interest rate particularly in developing countries. Therefore, there is a continuous debate on the key determinants of lending interest rate in different countries.

In developing countries like Ethiopia, banks act as the main players in channeling funds from surplus units to deficit units, and for this reason it is important that their intermediary role is carried out with the lowest possible costs in order to achieve social welfare. After financial sector reform, National Bank of Ethiopia imposed control over deposit rates in order to keep the lending rates low. The NBE had set the minimum saving interest rate and leaving lending rate to commercial banks with the aim of improving efficiency in the intermediation process. However, interest rates in Ethiopia are not yet set based on demand and supply forces (Sime et al, 2013).

One study by Belay (2015) has examined determinants of the interest rate spread in the banking sector in Ethiopia using a regression model based on consolidated industry and macroeconomic data. Another related study by Meshesha (2016) had also used bank-specific and macroeconomic data focusing on how these data influence net interest rate margin of commercial banks. However, previous studies did not specifically look at lending rates.

In general, lack of research study on the determinants of lending rates in the context of Ethiopian banking sector initiates this study. To the knowledge of the researcher, this is the first study that will investigate determinants of lending rates in Ethiopian commercial banking sector. Therefore, this study aims to fill the gap by giving more emphasis on both internal and external factors affecting lending rate of commercial banks in Ethiopia.

CHAPTER THREE

3. RESEARCH DESIGN AND METHODOLOGY

The purpose of this chapter is to present the methodology used to carry out the study. The chapter discusses about model specification and the variables used. The chapter is organized as follows. Section 3.1 presents the research approach adopted by the study. The population and sampling design for the study is explained under section 3.2. Then, data collection, analysis and presentation techniques were explained under section 3.3. The variable description, measurements and hypotheses were discussed under section 3.4 and finally regression model specification for the study was presented under section 3.5.

3.1 Research approach adopted

The choice of research design depends on objectives that the researcher wants to achieve (Admas et al., 2007). The choice of appropriate research design will help the researcher to answer the research questions and to satisfy the research objectives. Therefore, it is a paramount to properly define and evaluate the research design before conducting the research.

According to Creswell (2009), there are three basic research approaches; quantitative, qualitative and mixed research approaches. The quantitative data research relies on the measurement and analysis of statistical data to produce quantifiable conclusions. Quantitative research is a means for testing objective theories by examining the relationship among variables (Creswell, 2009).

Therefore, for this study quantitative research approach is used to see the relationship between the lending rate of commercial banks and the bank specific and macroeconomic factors affecting lending rate in Ethiopia by establishing causal relationship. A quantitative strategy is best suited as the research has a large focus on numbers and the use of hypothesis and statistical tools to analyze them. Thus, due to quantitative nature of data, the researcher have used quantitative research approach to examine the cause and effect relationships between lending rates of commercial banks and its determinants in this study.

This study also adopted an explanatory approach by using balanced panel research design to meet the research objective. As explained by Bhattacharje (2012), explanatory research attempts to identify causal factors and outcomes of the target phenomenon. Therefore, since this study

examines the relationship between lending rate of banks and its determinants; it is an explanatory research. According to Brooks (2008), a panel of data will embody information across both time and space and it measures some quantity about them over time. The advantage of using panel data is to address a broader range of issues and tackle more complex problems than would be possible with pure time-series or pure cross-sectional data alone. Panel data has also the advantage of giving more informative data as it consists of both the cross sectional information, which captures individual variability, and the time series information, which captures dynamic adjustment (Brooks 2008).

Therefore, the researcher have employed quantitative research approach and explanatory research design by using balanced panel data to see the regression result analysis with respective to empirical literatures on the determinants of lending rates of commercial banks.

3.2 Population Size and Sampling Procedure

Population of the Study: The total population of study includes all commercial banks operating in Ethiopia. According to NBE report, there are sixteen privately owned commercial banks and one publicly owned commercial bank at the end of June 30, 2017 (Appendix V). These are; Commercial Bank of Ethiopia (CBE), Awash Bank S.C (AWB), Dashen Bank S.C (DB), Bank of Abyssinia S.C (BOA), Wegagen Bank S. C (WB), United Bank S.C (UB), Nib International Bank S.C (NIB), Cooperative Bank of Oromia (CBO), Lion International Bank S.C (LIB), Oromia International Bank S.C (OIB), Berhan International Bank S.C (BIB), Zemen Bank S.C (ZB), Bunna International Bank S.C (BUB), Abay Bank S.C (ABB), Addis International Bank S.C (ADIB), Enat Bank S.C (EB) and Debub Global Bank S.C (DGB).

Sample and Sampling Procedure: For some researches, it is possible to collect data for the entire population as it can be manageable and data is available, while for some other researches data is collected on sample base. Sampling provides a valid alternative when it is impractical to survey the entire population and when there is budget and time constraint to surveying the entire population (Saunders et al, 2009). There are two types of sampling techniques; probability or representative sampling and non-probability or judgmental sampling. In the probability sampling, the chance or probability, of each case being selected from the population is known and is usually equal for all cases while in the non-probability sampling, the probability of each case being selected from the total population is not known (Saunders. et al, 2009).

According to Bhattacharjee (2012), non-probability sampling is sampling technique in which some units of the population have zero chance of selection or where the probability of selection cannot be accurately determined rather samples are selected based on certain non-random criteria, such as quota or convenience.

The sampling technique used in this research is a non-probabilistic sampling and among the non-probabilistic sampling methods, this research uses purposive sampling. As stated by Saunders et al (2009), purposive sampling is often used when working with small samples and when we wish to select cases that are particularly informative. Thus the researcher used purposive sampling by considering the availability of full data for the selected time period.

The study took thirteen commercial banks as the sample frame to drawing sample size to research. The frame for drawing sample included those commercial banks having at least eight years working experience in Ethiopia as of June 30, 2017 (i.e. from 2010 to 2017).

Thirteen commercial banks chosen for the study include; Commercial Bank of Ethiopia (CBE), Awash Bank S.C (AWB), Dashen Bank S.C (DB), Bank of Abyssinia S.C (BOA), Wegagen Bank S.C (WB), United Bank S.C (UB), Nib International Bank S.C (NIB), Cooperative Bank of Oromia (CBO), Lion International Bank S.C (LIB), Oromia International Bank S.C (OIB), Zemen Bank S.C (ZB), Berhan International Bank (BEB) and Bunna International Bank S.C (BUIB). According to Brooks (2008), while there is no definitive answer for an appropriate sample size for model specification, it should be noted that most testing procedures in econometrics rely on asymptotic theory. This theory states that as the sample size approaches to the population, the results from the sample estimates are more appropriate for generalizing to the general population. Thus, in this case the sample size nearly approaches to the population which enabled to make appropriate generalization to the overall population.

To obtain a balanced dataset, the researcher has excluded banks whose operations commenced later than 2010. The rationality for selection was due to availability of structured data and importance of their experience in the industry to understand factors that would affect bank's lending rate. Therefore, the matrix for the frame is 13*8 that includes 104 observations.

3.3 Data collection, Presentation and Analysis Techniques

3.3.1 Data and Data Collection Instruments

The study uses bank-specific micro and economy-wide macro data spanning the period from 2010 to 2017 on annual basis. The micro data cover a range of variables from commercial banks income statement and balance sheets as reported to the National Bank of Ethiopia. The macro data include gross domestic product and inflation. These variables are used to control for possible economy-wide effects on lending rates that may not be captured in the micro bank specific data. Thus, only secondary data was used for the study.

The data collected are then arranged in a panel data which is the two-dimensional data, namely a fusion between the dimension of time (time series) and the dimensions of commercial banks (cross section) so that it can provide a lot more information needed in the study.

Conducting appropriate data gathering instruments help researchers to combine the strengths and amend some of inadequacies of any source of data to minimize risk of irrelevant conclusion. Consistent and reliable research indicates that researches conducted by using appropriate data collection instruments increase the credibility and value of research findings (Koul, 2006). Accordingly, structured document analysis was used for this research to collect required information, which was relevant for addressing the objective of the study. Data was collected from audited financial statements (income statement and balance sheet) of each commercial banks included in the sample and various journals and publications of NBE and MOFEC for the macroeconomic data from 2010 to 2017. All data collected and figures for the variables were expressed as of June 30th of each year under study on annual base.

3.3.2 Data Presentation and Analysis

To achieve the objective of the study, the study was primarily based on panel data that were collected through structured document review. In order to test proposed hypotheses, a statistical analysis was carried out using the following methods: First, descriptive statistics of dependent and independent variables was calculated over the sample period. This is in line with Malhotra (2007), which states that using of descriptive statistic methods help the researchers in picturing the existing situation and allows gathering of relevant information. Then, correlation analysis among dependent and independent variables was made.

Finally, balanced random effect regression approach including all of its assumptions was employed. The selection between fixed effect and random effect panel estimation method was based on compatibility of the model based on number of cross-section, number of observations and nature of omitted variables. The panel regression results were presented in a tabular form evaluated using individual statistical significance test (T-test) and overall statistical significance test (F-test). The goodness of fit of the model would be tested using the coefficient of determination (R-squared). The researcher has also performed diagnostic tests to ensure whether the assumptions of the classical linear regression model (CLRM) are violated or not. In conducting all the data analysis, the study used Eviews 9 software package.

3.4 Variable Description, Measurement and Hypotheses of the Study

This study has focused on identifying the determinants of lending rates of Ethiopian commercial banks through testing hypotheses regarding to the relationships between lending rate of banks and bank specific and macro economic factors affecting it. It is apparent that the most significant task is to select the appropriate explanatory variables. As it was discussed on literature review part, some determinant factors which have significant impact on lending rate in one country may not have significant effect in another country. Though various bank specific and macroeconomic variables were included in the previous studies conducted world-wide; some bank specific and macro economic variables were incorporated in this study. Therefore, the following are variables selected based on previous relevant related studies and considering Ethiopian context. The description and operational definitions of selected variables are discussed here under.

3.4.1 Dependent Variable

Lending Rate of Banks: The dependent variable used in this study is the lending rate. Lending rates are the prices that borrowers paid when taking loans from the lenders. It is the interest rate in which banks levied on borrowers. It measures the implicit earnings of the bank from interest bearing activities. The lending interest rate on banks may vary depending on the tenure of the loan, the type and value of collateral, the economic sector of loan, etc. As result, it is advisable to take the average. For the purpose of this study, interest rate on loans and advances is defined as interest income from loans and advances as a fraction of total loans and advances. Thus, lending rate is calculated by taking interest income from income statement and loans and advances from balance sheet of commercial banks.

$$\text{Average Lending Rate} = \text{Interest Income} / \text{Loans and Advances}$$

From the equation above, the concept may look simple. However, it is important to note that banks offer a variety of financial products, with different rates and different maturity period. There exist business loans, personal loans, mortgages, staff loans among others. Even with in the same sector, lending rates still may differ depending on the credit ratings of the client. This study to be of worthwhile takes an average lending rate of each bank and different researchers have used the above measurement as proxy for lending rate in various studies.

Mbao et al. (2014) in their study ‘determinants of bank lending rates in Zambia’, have measured lending rate by using data obtained from commercial banks income statement and balance sheets as the ratio of the total interest income on loans over loans and advances as reported to the Bank of Zambia.

Mwangi Anthony Chege (2014) had used a lending rate as independent variable and measured it as the ratio of the total interest income on loans over loan balances on his investigation of the effect of interest rate in non-performing loans in Kenya.

Mekibib S. (2016) had also used bank lending rate as independent variable and has measured it as a fraction interest income from loans & advances to total loans and advances as a proxy in his study determinants of liquidity in commercial banks of Ethiopia.

3.4.2 Independent Variables

This section describes the independent variables that are used in the econometric model to estimate the dependent variable lending rate of commercial banks. According to the model presented, there are seven identified variables that determine lending interest rate of commercial banks; these are operating expenses, deposit rate, non-interest income, liquidity, asset size, gross domestic product and inflation. The following section presents each independent variable by grouping them in to two sections.

I. Bank Specific Variables

Bank specific variables include: operating expenses, deposit rate, non interest income, liquidity and size of bank Size.

- **Operating Expenses:** Banks incur costs of financial intermediation such as screening loan applicants to assess the risk profile of borrowers and monitor the projects for which loans are advanced. The operating expense of the banks is reported in the income statement at the end of the year. This may include expenses incurred in salaries and employee benefits, administrative expenses, depreciation and amortization, and IT expenses. An increase in this ratio implies a decrease in the efficiency or quality of management, which will translate into a higher lending rate. Thus, an increase in operating expense is expected to have positive influence on lending interest rate of banks. It shows increasing lack of ability of banks to reduce operating costs which may result in losses as banks are less efficient in managing their business. The study made by Mbao, Kapembwa, Mooka, Rasmussen and Sichalwe (2014), on the title ‘Determinants of Bank Lending Rates in Zambia’; found bank lending rates are significantly impacted by variables associated with higher cost structures. This suggests that, increases in bank costs tend to be passed on to borrowers in the form of higher lending rates. This variable is measured by the ratio of a bank’s total operating expenses to total assets.

☞ *H1: Operating Expense has positive and significant impact on bank’s lending rate.*

- **Deposit rate:** This consists of the interest paid on customer deposits and deposits from other banks. It measures the implicit input costs incurred for attracting interest bearing funds. The interest on deposits paid by banks for savers is expected to have positive influence on lending interest rate of banks. Uhde and Heimeshoff (2009) argued that short term increases in deposit rates increase the banks cost of funds causing the higher interest rate on loans. Thus, deposit interest rate is positively correlated with lending rate of banks.

☞ *H2: Deposit rate has positive and significant impact on bank’s lending rate.*

- **Non-Interest Income (NII):** Non-interest income reflecting product diversification refers to all the income of a commercial bank other than the interest income. This variable captures service charges obtained by commercial banks from their current account depositors by charging them some amount of fees by number of transactions. Stiroh (2002) classified non-interest income into a heterogeneous category that comprises fiduciary income, service charges, trading revenue, and fees and other income. This variable is measured by the ratio of a bank's non-interest income to operating income.

A high ratio of NII reflects the improved diversification of banks in non-traditional activities or market. In other words, this variable reflects the role of the intervention of banks in different markets in order to improve their performance. Thus, a positive coefficient for this variable is expected.

According to the study conducted in Zambia by Mbaio, et al. (2014), banks with improved income tend to benefit borrowers by lowering the interest rates they pay. Thus, the non-interest income is associated with a negative coefficient. Furthermore, as per the study by Ansari (2015), product diversification measured by the non-interest income variable (the income share of commission and fee income) has a significant negative coefficient on loan pricing of Indian banks suggesting possible cross-subsidization of traditional lending activities. Thus, banks decrease their lending rate when they are more reliant on fee generating products. Based on this, a negative relationship with lending interest rate is hypothesized.

☞ *H3: Non-interest income has negative and significant impact on bank's lending rate.*

- **Bank's Liquidity:** Bank for international settlement (2008) defines liquidity as “the ability of banks to fund increases in assets and meet obligations as they come due without incurring unacceptable losses”. Liquidity can also be defined as a measure of the relative amount of assets which can be quickly converted in to cash without any loss in value available to meet short term liabilities. The liquidity measure provides suggestions about the level of liquidity on which the commercial banks are operating.

According to NBE directive no SBB/57/2014, liquid assets include cash (local and foreign currency), deposits with National Bank and other expressed and payable in birr or foreign currency having acceptance by the National Bank. Accordingly, deposit refers to demand deposits, saving deposits and fixed time deposits of banks while short term borrowing refers any borrowing secured from National Bank of Ethiopia or any other interbank loans with the maturity period of less than one year. This ratio indicates the percentage of short term obligations that could be met with the bank's liquid assets in the case of sudden withdrawals. The higher this ratio signifies that the bank has incurring opportunity costs of holding extra liquidity. More liquid banks are expected to have higher lending rates in order to compensate for the opportunity costs of holding extra liquidity. Thus, this variable is expected to have a positive relationship with lending rate since excess liquidity is an implicit expense for the banks because of the opportunity cost associated with excess liquidity.

☞ *H4: Bank's liquidity has positive and significant impact on bank's lending rate.*

- **Total Asset Size of Banks (SIZE):** The bank's total asset is another bank specific variable that affects the lending rate of banks. It is a variable that is used to measure the economic scale or general capacity to undertake its intermediary function. In most of the studies on banking, the bank's total assets are used as a proxy. In this study, bank size is measured by the natural logarithm of total assets as used Demirguc-Kunt et al. (2004)

Total asset size of banks is expected to influence lending rate of banks differently. Theoretically one would expect bigger banks to be associated with lower interest rate arguably because of large economies of scale and ability to invest in technology that would enhance efficiency. Economies of scale benefits large banks by reducing the cost of production and information gathering. On the other spectrum, larger banks are expected to have greater market power and better access to government safety net subsidies relative to smaller banks. Relatively smaller banks may be at a competitive disadvantage in attracting the business of larger loan customers. Thus, to the extent bank size connotes control of the market in the deposit and loan markets, a positive relationship between bank size and interest rate should be not surprising. This study has proposed asset size to have negative relationship with lending rate in favor of economies of scale theory.

☞ *H5: Total asset size has negative and significant impact on bank's lending rate.*

II. Macroeconomic Variables

Macroeconomic variables included in this study are GDP and inflation. Macroeconomic variables represent factors that influence business performances in the economy and these variables are taken into account when pricing a loan. An unsound macroeconomic condition is perceived as more unsafe and banks may compensate for it by setting higher lending rates.

- **Gross Domestic Product (GDP):** GDP is an indicator of the economic health of a country as well as the gauge of country's standard of living. It is the measurement of level of economic activity of a country. Economic growth is an important variable in the determination of lending interest rate because it affects demand and supply of bank services such as deposits and loans. During periods of good economic condition, loan demand tends to be higher, allowing banks to provide more loans.

A strong economic condition measured by GDP, as motivating factor to banks has statistically significant impact on issuance of more private credit to businesses. A strong economic condition creates more demand for goods and services which lead to more investment in different sectors hence it increases the demand for credit (Kashif and Mohammed, 2008).

There is no consensus on how economic growth affects lending interest rate. Some studies argue that economic growth has a positive effect on interest rate (Claessens et al., 2001), while others find a negative effect (Demirgüç-Kunt & Huizinga, 1999; Demirgüç-Kunt, 2004 and Carbo & Rodriguez, 2007).

The study by Gambacorta (2004) explained that the interest rate that banks set on their loan have positive correlation with GDP growth. In a situation where there is an increase in economic condition in a particular country, a project that appears not to be profitable venture become profitable when discounted at the present time. This means that an increase in economic conditions will result in an increase in demand for loan which will lead to high rate on the loan. On the other hand, if the economic condition leads to low demand for credit because many people now have money with them will result in low demand for credit will lead to low lending rate. Thus, banks make more loans during periods of economic boom

because during such periods, businesses make huge profits, more investment opportunities open, and thus demand for loan (additional funding) increases.

☞ *H6: Real GDP growth rate has positive and significant impact on bank's lending rate.*

- **Inflation (INF):** Inflation is important macroeconomic variable which may affect bank's lending rate. This variable is an indicator of the cost of doing business in an economy. Inflation is an increase in the general price level and is typically expressed as an annual percentage rate of change. Inflation depreciates the value of money.

High inflation rate is associated with higher costs as well as higher income. Here, we can distinguish between two situations: the first is when inflation is properly anticipated and interest rates are adjusted so as incomes rise faster than the costs of credit institutions, in this case it will have a positive effect on bank lending rates. The second situation is when inflation is not properly anticipated and banks are not able to adjust interest rates, in this case the cost of credit institutions exceed the income and inflation will have a negative effect on the bank lending rates. Thus, the effects of inflation on bank interest depend on whether inflation is anticipated or unanticipated. If inflation is anticipated, then the banks adjust interest rate accordingly, thereby increasing the interest rate. On the other hand, if inflation is not anticipated, then banks may be slow in adjusting their interest rates and so may affect the interest rate negatively because of increased costs occasion by inflation (Perry, 1999).

Among several related studies conducted previously, some studies suggested a positive relationship between inflation and lending rate while some other studies had found negative relationship.

Although there is no empirical consensus on the effects of inflation on interest rate, the researcher argue that high inflation rates are generally associated with high interest rates. When inflation increases, banks also increase their cost of credit to keep the space with inflation, which will result in increased lending rates. Inflation data used in this study is that the inflation rate announced by National Bank of Ethiopia as the central bank and a positive relationship between inflation rate and banks lending rate is expected.

☞ *H7: Inflation rate has positive and significant impact on bank's lending rate.*

Table 3.1: Summary of explanatory variables and their expected effects on the dependent variable

| <i>Variables</i> | <i>Symbol</i> | <i>Operational Definition</i> | <i>Expected Sign</i> |
|--------------------------------|---------------|---|----------------------|
| ❖ Dependent Variable | | | |
| ✓ Bank lending rate | LR | Interest income as fraction of loans and advances | NA |
| ❖ Independent Variables | | | |
| ✓ Operating cost ratio | OPE | Operating Expenses to Total Assets | + |
| ✓ Deposit Rate | DR | Interest expense as fraction of interest bearing deposits | + |
| ✓ Non-Interest Income | NII | Non-interest income to Operating Income | - |
| ✓ Liquidity | LIQ | Liquid assets to total assets of banks | + |
| ✓ Total asset size | SIZE | Natural logarithms of total assets | - |
| ✓ Gross domestic Product | GDP | Annual real growth rate of GDP | + |
| ✓ Inflation | INF | Annual general consumer price index | + |

- (+) *When the independent variable increases (decreases), the dependent variable will also increase (decrease).*
- (-) *When the independent variable increases (decreases), the dependent variable will (decrease) increase.*

As it can be seen from table 3.1 above, it is expected that only two factors could have negative impact on banks' lending rate while the rest of five variables are expected to have positive impact on banks' lending rate.

3.5 Model Specification

It could be inferred from the works reviewed in the previous sections; that the lending rate of commercial bank is determined by some factors both at the micro and macro levels. Thus in respect of the hypotheses stated above, the main issue is an investigation of relationship that exists between the lending rate of commercial banks and each of explanatory variables that had been identified through literature and theories i.e. operating expenses, deposit rate, non-interest income, liquidity ratio, asset size of banks, gross domestic product and inflation. Other factors that are not explicitly included in the model were captured by the error term in the model.

The nature of data that was used in this study enabled to use panel/longitudinal data model which comprises of both cross-sectional elements and time-series elements; the cross-sectional element is reflected by the different Ethiopian commercial banks and the time-series element is reflected in the period of study (2010-2017). The advantage of panel data in question is because it contains more information; it incorporates variability among cross section units and across time (Gujarati, 2004).

According to Brooks (2008), a panel of data will embody information across both time and space and it measures some quantity about them over time. The advantage of using panel data is to address a broader range of issues and tackle more complex problems than would be possible with pure time series or pure cross-sectional data alone. Panel data has also advantage of giving more informative data as it consists of both the cross-sectional information which captures individual variability and the time series information that captures dynamic adjustments (Brooks, 2008).

In light of the above, in order to investigate the determinants of bank specific and macro economic factors of commercial banks lending rate, the general multivariate regression model was adopted.

$$Y_{it} = \alpha + \beta X_{it} + u_{it}$$

The subscript i denote the cross- section and t represent the time-series dimension. The left hand variable Y_{it} is the dependent variable, α is intercept term, β is coefficient which represents the slope of the explanatory variables and X_{it} is a vector of the explanatory variables for bank i in time t , $t = 1, \dots, T$; $i = 1, \dots, N$ and u_{it} is the error term.

Therefore the general model which incorporates all of the variables to test hypotheses of the study was;

$$LR_{it} = \beta_0 + \beta_1(OPE)_{it} + \beta_2(DR)_{it} - \beta_3(NII)_{it} + \beta_4(LIQ)_{it} - \beta_5(SIZE)_{it} + \beta_6GDP_t + \beta_7INF_t + \delta_i + \varepsilon_{it} \dots\dots\dots 3.1$$

Where;

- **LR_{it}** : is the lending interest rate proxied as fraction of interest income to loans and advances of *ith* bank on the year ‘t’
- **(OPE)_{it}** : is the ratio of operating expenses to total assets of *ith* bank on the year ‘t’
- **(DR)_{it}** : is deposit interest rate of *ith* bank on the year ‘t’
- **(NII)_{it}** : is non-interest income of *ith* bank on the year ‘t’
- **(LIQ)_{it}** : is the liquidity of *ith* bank on the year ‘t’
- **(SIZE)_{it}** : Natural logarithm of total assets of *ith* bank on the year ‘t’
- **(GDP)_t** : is the real gross domestic product growth of Ethiopia on the year ‘t’.
- **(INF)_t** : is the inflation rate in Ethiopia on the year ‘t’
- **δ_i**: Disturbance term an individual specific effect
- **ε_{it}** Remainder disturbance that varies over time and entities
- **β₀**: is constant

The bank specific variables are both cross-sectional and time variant whereas the macroeconomic variables are only time variant but are converted to panel data by including macroeconomic variables for each cross-sectional unit.

3.6 Summary

The chapter has begun by outlining the research methodology that was adopted for the study. It went on to discuss the model specification that was adopted in conducting the research. The chapter outlined the type and sources of data that were utilized in the study. It also looked at the operational definition and justification for the variables that were adopted from the literatures. The next chapter looks at data analysis, presentations and interpretations.

CHAPTER FOUR

4. DATA PRESENTATION AND ANALYSIS

4.1 Introduction

In the preceding chapters, important literatures related to the topic that may give enough understanding about the subject matter and the methodology selected to meet research hypotheses had been discussed. In this chapter, detail analysis about the descriptive statistics and regression results has been made. Specifically, the chapter has included four sections. The first section presented descriptive analysis of variables using graphs and tables to provide insight on the distribution of the data by banks and across time. The second section deals with the correlation analysis and shows the degree of association between the study variables. Section three presented the classical linear regression model assumption diagnostic test results. Finally the fourth section has presented the results of the regression analysis and discussions on regression analysis.

4.2 Descriptive Statistics Analysis

This section presents the descriptive statistics of dependent and explanatory variables used in the study. The dependent variable used in this study was lending rate of commercial banks (LR) while explanatory variables are deposit rate (DR), operating expenses (OPE), non-interest income (NII), liquidity (LIQ), asset size of banks (SIZE), gross domestic Product (GDP) and inflation (INF).

Table 4.1 shows the summary descriptive results for all the variables used in the study such as mean, median, maximum, minimum, standard deviation and number of observations.

Table 4.1 Descriptive statistics of dependent and explanatory variables over the study period from 2010 to 2017

| | Lending Rate | Operating Expenses | Deposit Rate | Non-Interest Income | Liquidity | Asset Size | Gross Domestic Product | Inflation |
|---------------------|---------------------|---------------------------|---------------------|----------------------------|------------------|-------------------|-------------------------------|------------------|
| <i>Mean</i> | 0.1211 | 0.0340 | 0.0399 | 0.4105 | 0.3078 | 3.9479 | 0.1260 | 0.1353 |
| <i>Median</i> | 0.1212 | 0.0332 | 0.0395 | 0.4101 | 0.2789 | 3.9702 | 0.1180 | 0.0900 |
| <i>Maximum</i> | 0.1576 | 0.0760 | 0.0568 | 0.7669 | 0.5789 | 5.6154 | 0.3555 | 0.3325 |
| <i>Minimum</i> | 0.0897 | 0.0124 | 0.0239 | 0.1726 | 0.1356 | 2.5792 | (0.0772) | 0.0726 |
| <i>Std. Dev.</i> | 0.0154 | 0.0103 | 0.0063 | 0.1153 | 0.1275 | 0.5747 | 0.1131 | 0.0914 |
| <i>Observations</i> | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 |

Source: Eviews outputs and own estimation of research data 2010 – 2017

On average, the lending interest rate of commercial banks measured by ratio of interest income on loans and advances to total loans and advances ranges from 8.97 to 15.76 percent. It has a mean of 12.11% showing standard deviation of 1.54% from its mean value. The analysis indicated that lending rate of commercial banks in Ethiopia has exhibited an increasing trend within the study period from 2010 to 2017.

Operating expense ratio that was measured using total non-interest expense divided by total assets ranges from a minimum of 1.24% to a maximum of 7.6%. It has a mean of 3.4% with standard deviation of 1.03% from its mean value.

Deposit interest rate measured by ratio of interest expense to total interest bearing deposits ranges from 2.39% to 5.68%. It has a mean value of 3.99% with standard deviation of 0.63% from its mean value.

A non-interest income that was measured as ratio of non-interest income to operating income ranges from a minimum of 17.26% to a maximum of 76.69% with a mean value and standard deviation of 41.05% and 11.53% respectively.

The liquidity ratio measured using total liquid assets to total assets ranges from minimum value of 13.56% to a maximum of 57.89% with a mean value of 30.78% and standard deviation of 12.75%.

Furthermore, the asset size of banks measured by total assets demonstrates a minimum of 2.58 and maximum of 5.6 with a mean value of 3.95 and standard deviation of 0.57.

Macroeconomic explanatory variables such as gross domestic product growth and inflation showed a mean of 12.6% and 13.53% and a standard deviation of 11.31% and 9.14% respectively within the study period.

The mean and median values of all the research variables lie within their maximum and minimum values showing a good level of consistency.

4.3 Trend Analysis of Research Variables

Trend analysis is a technical analysis of the movement of variables based on the past data. This analysis establishes a pattern for research variables and their relationship with dependent variable, lending rate of commercial banks.

4.3.1 Trend Analysis of Lending Rate

This analysis establishes a pattern for lending rate of commercial banks operating in Ethiopia during the study period consideration from 2010 to 2017 by taking an average rate. Accordingly, the following figure provides a pictorial presentation of lending rate on which the level of lending rate is presented on Y axis and time is represented on X axis. Lending rate was measured by taking average of 13 commercial banks which are selected in the study for each year.

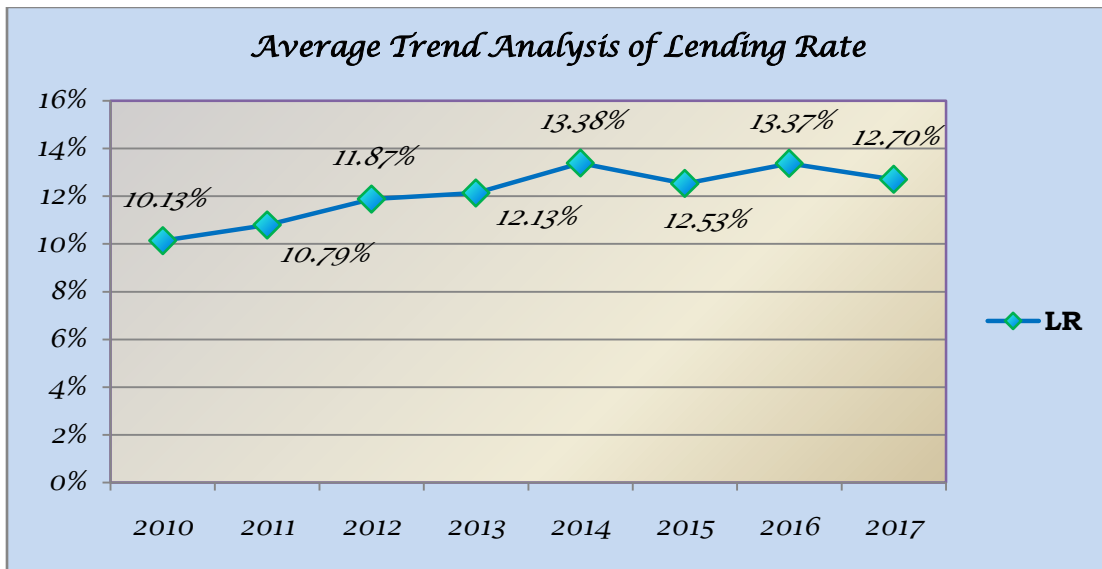


Figure 4.1: Trend Analysis of average lending rate of commercial banks from 2010 to 2017

4.3.2 Trend Analysis of Independent Variables

This analysis tried to present the relationships between lending rate and independent variables through pictorial presentation to look on movements and patterns of relationship.

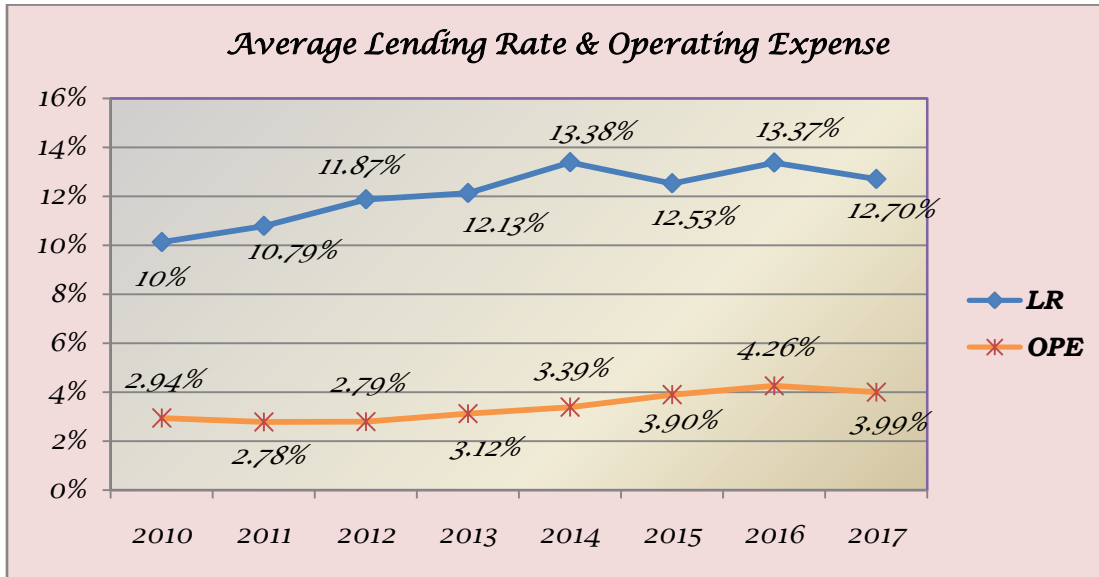


Figure 4.2: Relationship between lending rate & operating expenses of commercial banks

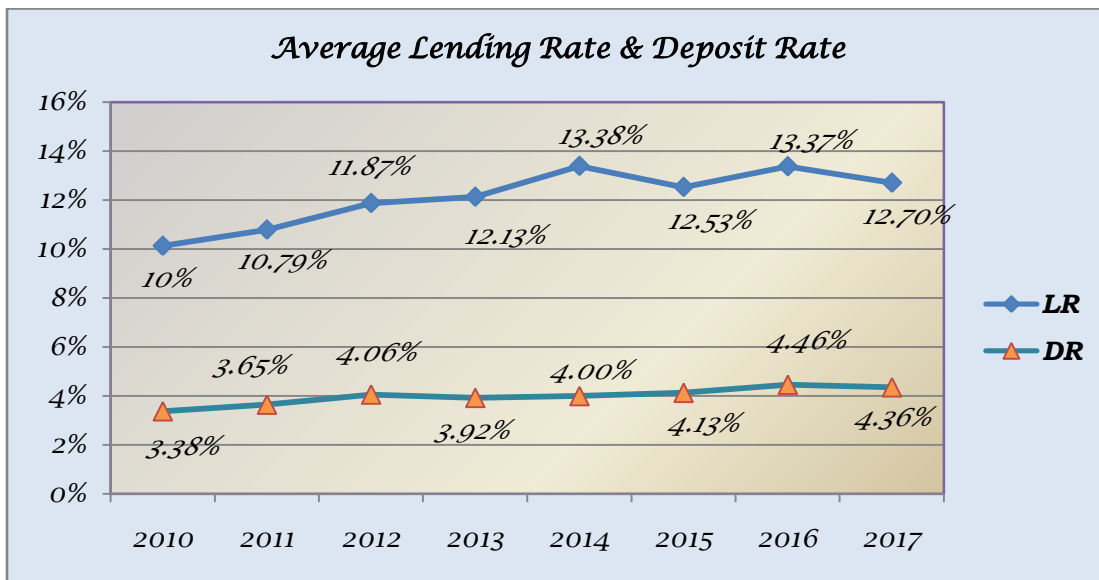


Figure 4.3: Relationship between lending & deposit rate of commercial banks from 2010 to 2017

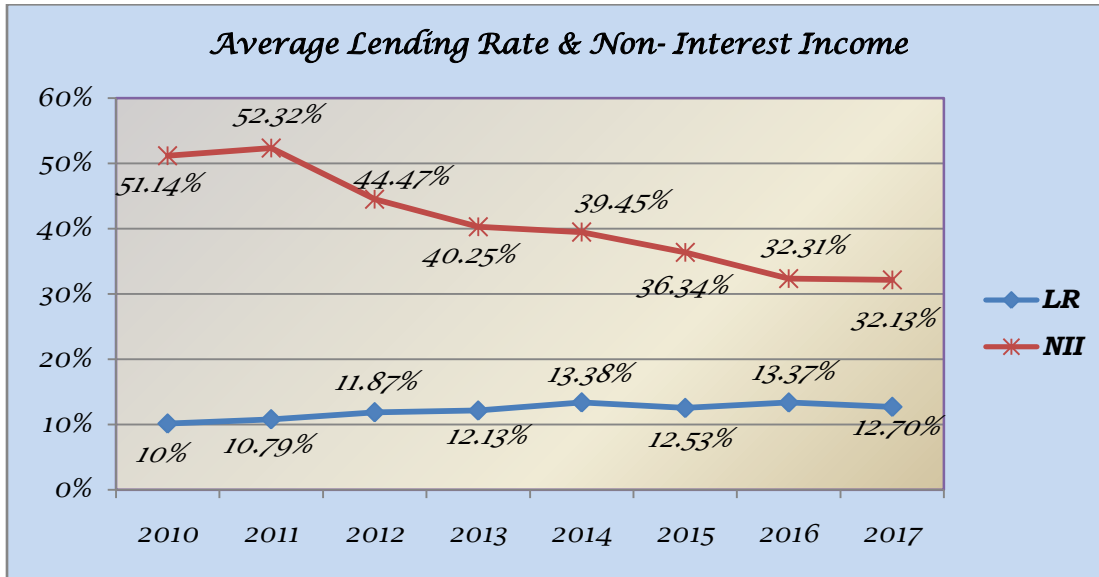


Figure 4.4: Relationship between lending rate & non-interest income of commercial banks

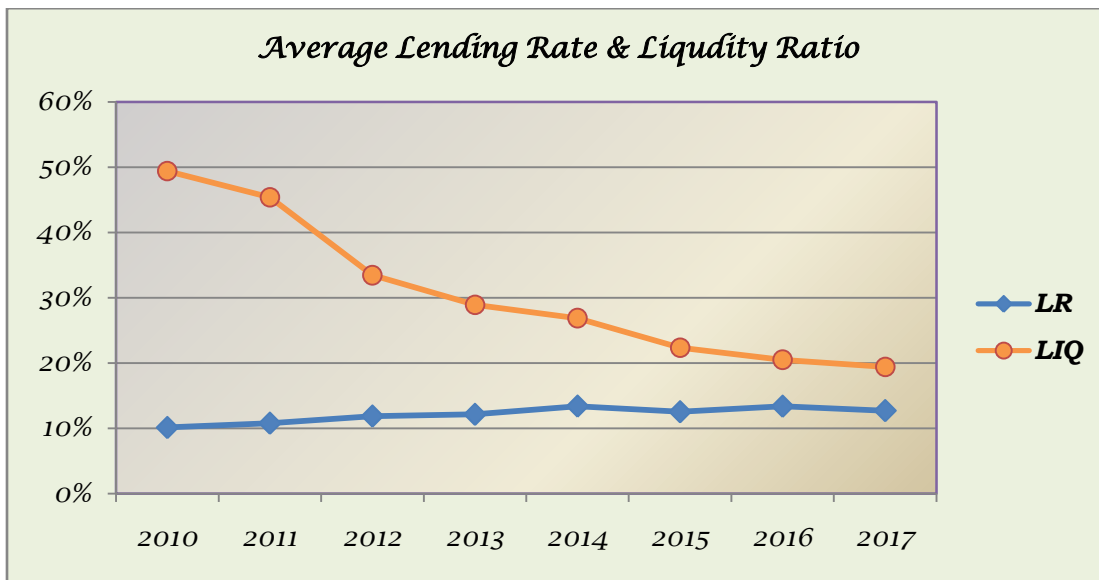


Figure 4.5: Relationship between lending rate & liquidity ratio of commercial banks

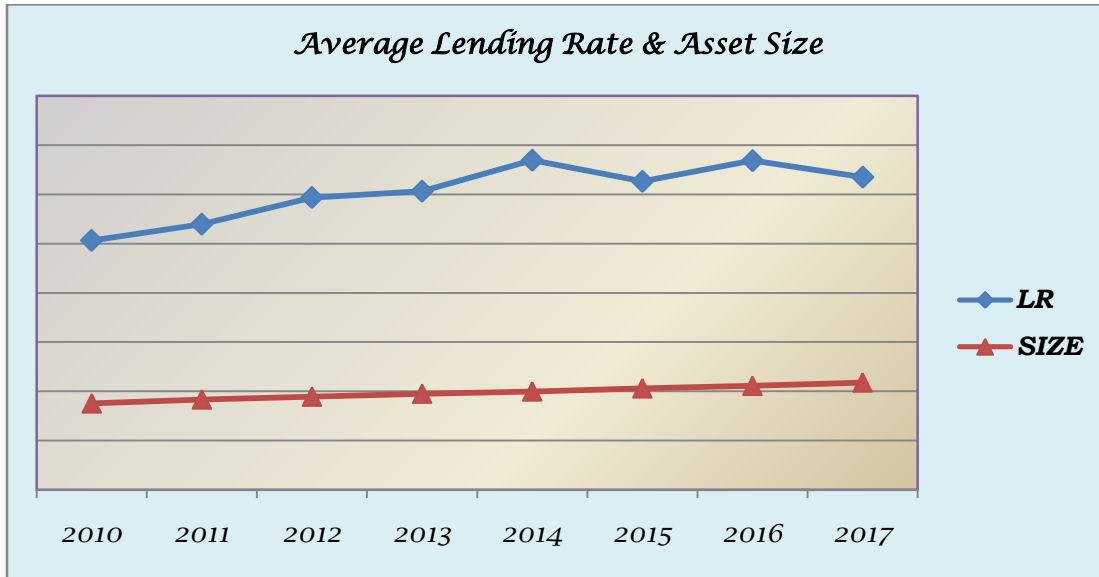


Figure 4.6: Relationship between lending rate & asset sizes of commercial banks

Source: Financial statements of sampled commercial banks and authors own compilation

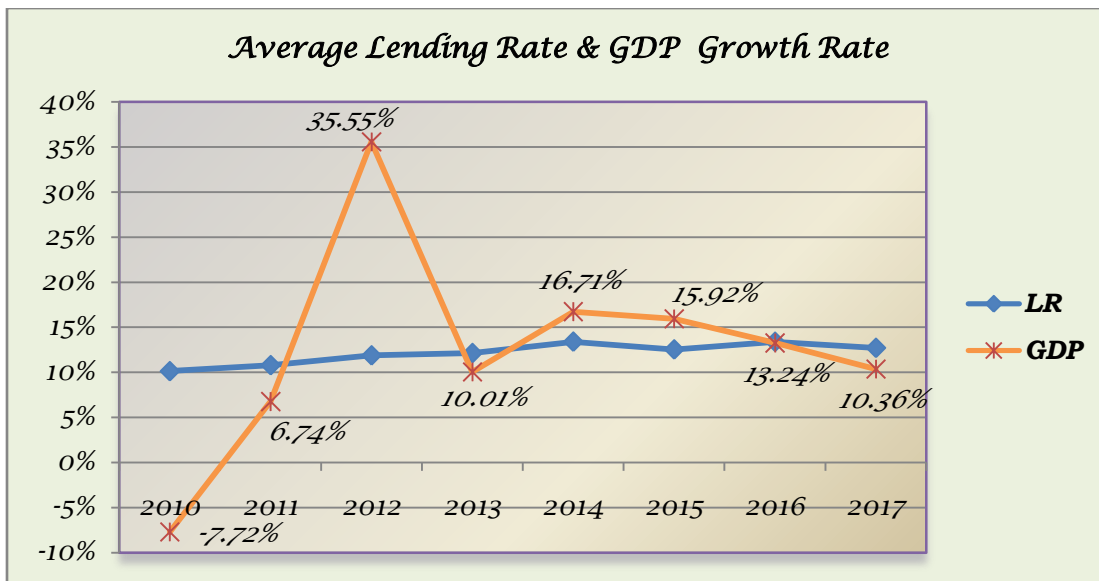


Figure 4.7: Relationship between lending rate of commercial banks & GDP growth rate

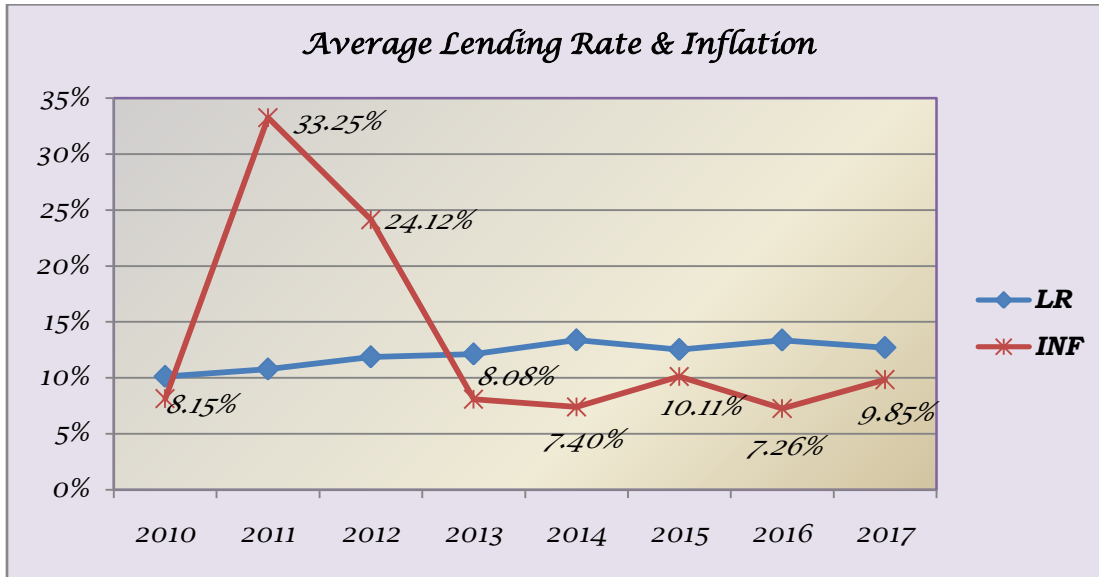


Figure 4.8: Relationship between lending rate of commercial banks and Inflation rate

Source: Authors own compilation

4.4 Correlation Analysis

Prior to regression result, it is important to check the correlation between different variables on which the analysis is built. A correlation is the way to index the degree to which two or more variables are associated with or related to each other. The purpose of undertaking correlation analysis is to check whether the variables move together or not in the same direction and the correlation coefficient indicates the strength of a linear relationship between two variables. As noted by Gujarati, 2004, most widely used bi-variant correlation statistics is the Pearson product movement coefficient, commonly called the Pearson correlation which was used in this study. Correlation coefficient between two variables ranges from +1 (i.e. perfect positive relationship) to -1 (i.e. perfect negative relationship). If the correlation coefficient is 0, the movement of variables is said to have no correlation.

Table 4.2 presents the correlation matrix among the variables which was done to examine any serial correlations among the study variables.

Table 4.2 -Correlation Matrix (With Dependent Variable)

| | <i>LR</i> | <i>OPE</i> | <i>DR</i> | <i>NII</i> | <i>LIQ</i> | <i>SIZE</i> | <i>GDP</i> | <i>INF</i> |
|-------------|-----------|------------|-----------|------------|------------|-------------|------------|------------|
| <i>LR</i> | 1.000 | | | | | | | |
| <i>OPE</i> | 0.215 | 1.000 | | | | | | |
| <i>DR</i> | 0.434 | 0.241 | 1.000 | | | | | |
| <i>NII</i> | (0.641) | (0.082) | (0.167) | 1.000 | | | | |
| <i>LIQ</i> | (0.571) | (0.233) | (0.354) | 0.705 | 1.000 | | | |
| <i>SIZE</i> | 0.435 | (0.288) | 0.090 | (0.536) | (0.652) | 1.000 | | |
| <i>GDP</i> | 0.352 | 0.005 | 0.288 | (0.192) | (0.370) | 0.134 | 1.000 | |
| <i>INF</i> | (0.334) | (0.320) | (0.157) | 0.386 | 0.418 | (0.209) | 0.267 | 1.000 |

Source: Eviews output results (2010 -2017)

Based on the Eviews output, non-interest income, liquidity and inflation are negatively correlated with lending rate. The negative correlation figure shows that when the mentioned independent variables increase lending rate decreases and vice versa. On the other hand, a dependent variable lending rate has positive correlation with deposit rate, operating expense, asset size and gross domestic product showing that when named independent variables increase; lending rate also increases.

4.5 Testing Assumptions of Classical Linear Regression Model (CLRM)

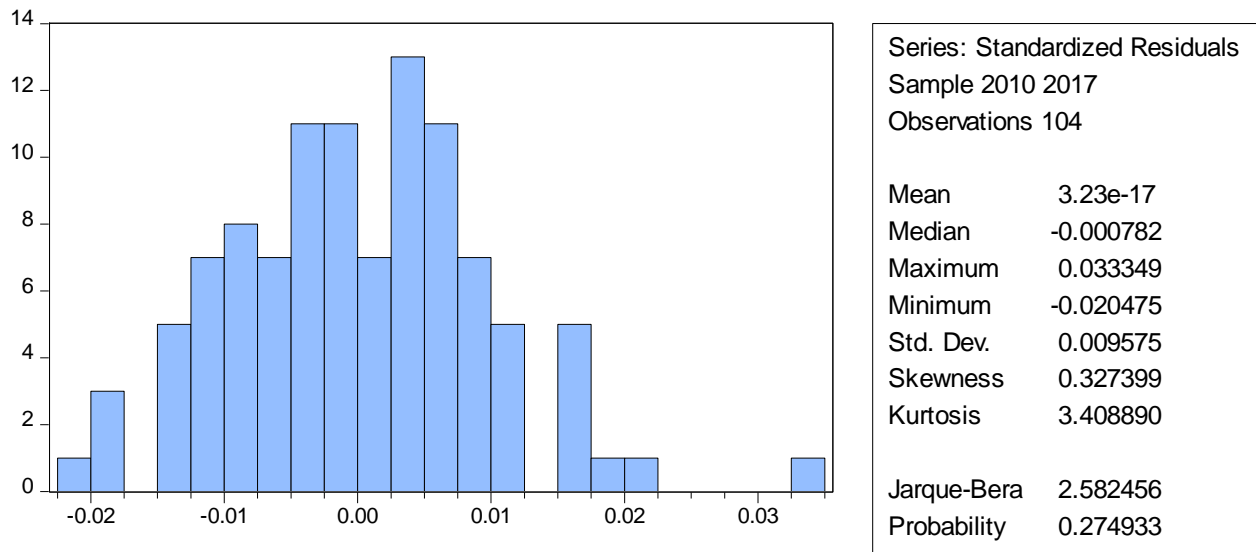
The researcher has conducted diagnostic tests to guard against the possibility of obtaining and interpreting spurious regression results. In the way to make sure the model is valid, consistent and reliable the researcher has applied the following tests and the results of the tests are presented in the following sections.

4.5.1 Normality Test

A normal distribution is not skewed and is defined to have a kurtosis coefficient of 3. Bera-Jarque formalizes this by testing the residuals for normality and testing whether the coefficient of skewness and kurtosis are 0 and 3 respectively. Skewness measures the extent to which a distribution is not symmetric about its mean value and kurtosis measures how far the tails of the distribution are. According to Brooks (2008), if the residuals are normally distributed, the

histogram should be bell shaped, the kurtosis must be no by far large from the 3 and Bera-Jarque probability statistics/P-value is also expected not to be significant. This means that the P-value given at the bottom of the normality test screen should be greater than 0.05 not to reject the null hypothesis of normality at 5% significance level. The test result for the model provides a P value greater than 5% evidencing that residuals are normally distributed and the histogram is bell shape for the model.

Table 4.3 –Normality Test



Source: Eviews output results (2010 -2017)

4.5.2 Test for Multi-co linearity

The term multi-co linearity indicates the existence of exact linear association among some or all explanatory variables in the regression model. When independent variables are multi collinear, there is overlapping or sharing of predictive power. Thus, if multi co-linearity is perfect, the regression coefficients of the independent variables are undetermined and their standard errors are immeasurable (Gujarati, 2004). Multi co-linearity makes significant variables insignificant by increasing P-value since increased P- value lowers the t-statistics value. Thus, the panel regression results with multi co-linearity will show significant variables as insignificant variables.

Many authors have suggested different level of correlation to judge the presence of multicollinearity. As noted by (Gujarati, 2004), a serious problem for multi co-linearity is occurred if the correlation is about 0.8 or larger i.e. if pair-wise or zero-order coefficient between two regressors is out of the recommended range of multi co-linearity which is -0.8 or 0.8.

While (Hair, 2006) argued that correlation coefficient below 0.9 may not cause serious multicollinearity problem; (Malhotra, 2007) on the other hand stated that multicollinearity problem exists when the correlation coefficient among variables is greater than 0.75. This indicates that there is no consistent agreement on the exact level of correlation that causes multicollinearity.

Accordingly, the results of the test for existence of multi co-linearity among seven of the independent variables are presented in the correlation analysis matrix here below.

Table 4.4-Correlation Matrix among Independent Variables

| | OPE | DR | NII | LIQ | SIZE | GDP | INF |
|-------------|------------|-----------|------------|------------|-------------|------------|------------|
| OPE | 1.000 | | | | | | |
| DR | 0.241 | 1.000 | | | | | |
| NII | (0.082) | (0.167) | 1.000 | | | | |
| LIQ | (0.233) | (0.354) | 0.705 | 1.000 | | | |
| SIZE | (0.288) | 0.090 | (0.536) | (0.652) | 1.000 | | |
| GDP | 0.005 | 0.288 | (0.192) | (0.370) | 0.134 | 1.000 | |
| INF | (0.320) | (0.157) | 0.386 | 0.418 | (0.209) | 0.267 | 1.000 |

Source: Eviews output results (2010 -2017)

The results in the above correlation matrix show that the highest correlation of 0.705 between liquidity and non-interest income and (0.652) between liquidity and asset size. Thus, there was no such series pair-wise correlation that exceeds 0.8 which suggests there is no serious problem of multi co-linearity or the results showed that the problem of multi co-linearity did not exist among the explanatory variables in the study model.

4.5.3 Heteroscedasticity Test

It has been assumed that the variance for the error terms is constant. This is known as the assumption of homoscedasticity. If the errors do not have a constant variance, they are said to be heteroscedastic. To test this assumption, the White's test was used. In this case both F - and χ^2 Chi Square (LM) versions of the test statistic give the same conclusion that there no evidence for the presence of heteroscedasticity, since the p values are considerable in excess of 0.05 we couldn't reject the null hypothesis of homoscedasticity. In the following table both the F - and χ^2 -test statistic give the same conclusion that there is no evidence for the presence of heteroscedasticity since p value for the model is greater than 0.05 and the researcher couldn't reject the null hypothesis of homoscedasticity.

The third version of the statistics 'Scaled explained SS', which is, as the name suggests, based on a normalized version of the explained sum of squares from the auxiliary regression also gave the same conclusion.

Table 4.5- Heteroscedasticity Test: White Summary

Heteroskedasticity Test: White

| | | | |
|----------------------------|----------|----------------------------|--------|
| <i>F-statistic</i> | 0.626980 | <i>Prob. F(7,96)</i> | 0.7325 |
| <i>Obs*R-squared</i> | 4.546731 | <i>Prob. Chi-Square(7)</i> | 0.7151 |
| <i>Scaled explained SS</i> | 4.894253 | <i>Prob. Chi-Square(7)</i> | 0.6729 |

Source: Eviews output results (2010 -2017)

Generally, as can be shown from above table, both the F -test- and χ^2 versions of the test statistic give the same conclusion that there is no evidence for the presence of heteroscedasticity since the p -values are considerably in excess of 0.05. The third version of the test statistic, "scaled explained SS" also gives the same conclusion. In general, the entire regression model used in this study reveals that the variance of the error term was constant or homoscedastic and we had no sufficient evidence to reject the null hypothesis of homoscedasticity.

4.5.4 Autocorrelation Test

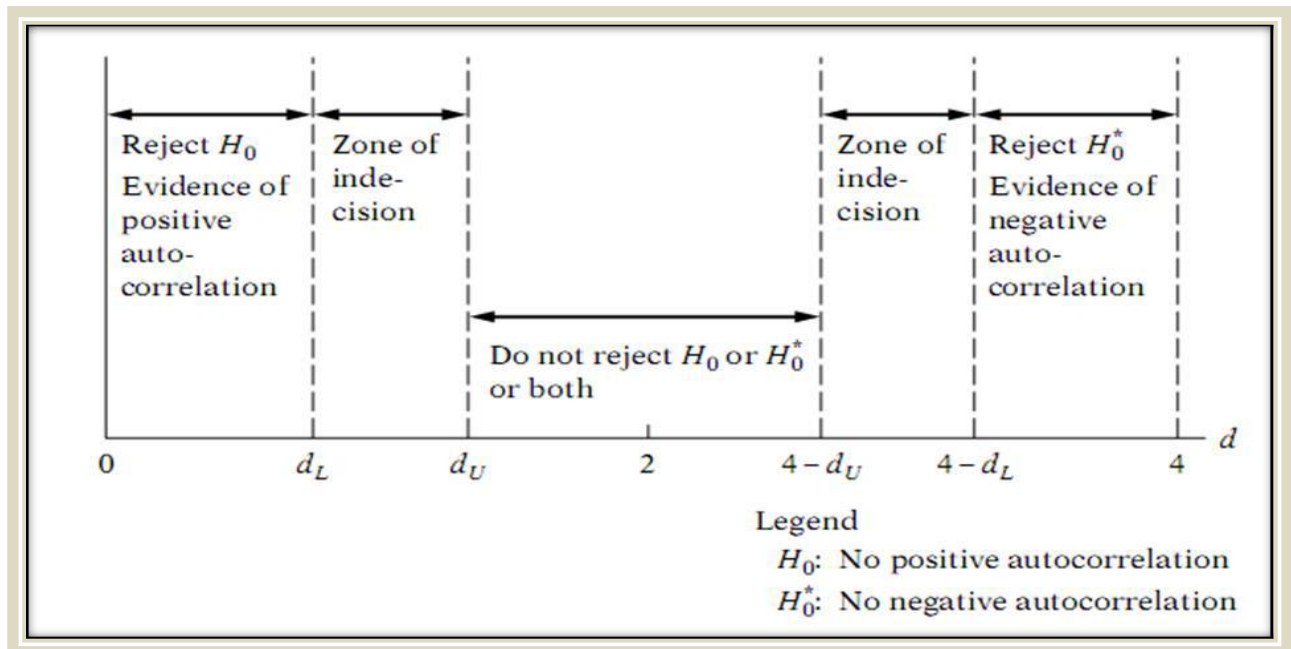
The CLRM assumption requires absence of autocorrelation or the covariance between the error terms is zero. In other words, it is assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are "auto

correlated” or that they are “serially correlated”. The first step in testing whether the error series from an estimated model are auto correlated would be to plot the residuals and looking for any patterns. However, graphical methods are difficult to interpret in practice and hence a formal statistical test should also be applied. The researcher has used Durbin-Watson autocorrelation test and Breusch-Goldfrey serial correlation LM test. Both methods confirm that there is no problem of autocorrelation.

A. First order Durbin-Watson Autocorrelation Test

The test of autocorrelation was made by using Durbin-Watson (1951). Durbin-Watson (DW) test is a test for first order autocorrelation i.e. it tests only for a relationship between an error and its immediately previous value. A Durbin Watson statistic around two is generally accepted though there are zones of indifference and zones of both positive and negative correlation. The null hypothesis for the DW test is no autocorrelation between the error term and its previous lag. According to Brooks, 2008, DW has two critical values; an upper critical value (d_U) and a lower critical value (d_L) and there is also an intermediate region where the null hypothesis of no autocorrelation can neither be rejected nor not rejected. The rejection, non-rejection and inconclusive regions are shown on the number line in figure 4.9.

Figure 4.9-Rejection and Non-Rejection Regions for DW Test



Source: Basic Econometrics, Fourth Edition by Gujarati, 2004 Page no. 469.

The study had used the dL and dU values for 104 observations. As per the DW table for 104 observations with 7 variables at 1% level of significance, the dL and dU values are 1.4000 and 1.693 respectively. The DW value for 104 observations on regression result was 1.867461. The DW value lies in the non-rejection region i.e. do not reject the null hypothesis (no evidence of autocorrelation which indicates the absence of serial correlation).

B. Breusch-Goldfrey Serial Correlation LM Test

Breusch-Goldfrey Serial Correlation LM Test is another test for autocorrelation in residuals. The Breusch-Goldfrey test is used because DW test is not reliable when lagged values are used in the model. The Breusch-Goldfrey test is much more general in that it allows for both AR and MA error structures as well as the presence of lagged regress and as an explanatory variable (Guajarati, 2004). The null hypothesis is that there is no serial correlation. The summary statistic is depicted here below;

Table 4.6- Breusch-Goldfrey Serial Correlation LM Test (Summary)

Breusch-Godfrey Serial Correlation LM Test:

| | | | |
|----------------------|-----------------|----------------------------|---------------|
| <i>F-statistic</i> | <i>1.504774</i> | <i>Prob. F(2,94)</i> | <i>0.2274</i> |
| <i>Obs*R-squared</i> | <i>3.226414</i> | <i>Prob. Chi-Square(2)</i> | <i>0.1992</i> |

Source: Eviews output results (2010 -2017)

Table 4.6: Shows that Breusch-Goldfrey Serial Correlation LM Test gives an F-statistic of 1.5047 with a probability of 0.2274 and chi-square version gives 3.2264 with probability of 0.1992. As result, we fail to reject null hypothesis of no auto correlation in the residuals even at 10% significance level.

4.5.5 Test for weather average value of the error term is Zero

The first assumption required is that average value of errors is zero. In fact, if a constant term is included in the regression equation, this assumption will never be violated. Therefore, since the constant term (i.e. β_0) was included in the regression equation the average value of the error term in the study is expected to be zero.

4.6 Test for Model Specification: Ramsey RESET Tests

A further implicit assumption of the classical linear regression model is that the appropriate ‘functional form’ is linear. Model specification error occurs when omitting a relevant independent variable, including unnecessary variable or choosing the wrong functional form. When the omitted variable is correlated with the variable which included, the estimators will be biased and inconsistent and model specification error will tends to occur. If the omitted variable is not correlated with the included variable, the estimators are unbiased and consistent and model specification error will not occur. Therefore, in order to select a correct estimated model, the researcher had conducted the Ramsey-RESET Test to check on the model specification.

Table 4.7- Ramsey RESET Test

Ramsey RESET Test
Equation: EQ01
Specification: LR C OPE DR NII LIQ SIZE GDP INF
Omitted Variables: Squares of fitted values

| | <i>Value</i> | <i>df</i> | <i>Probability</i> |
|-------------------------|-----------------|----------------|--------------------|
| <i>t-statistic</i> | <i>0.362315</i> | <i>95</i> | <i>0.7179</i> |
| <i>F-statistic</i> | <i>0.131272</i> | <i>(1, 95)</i> | <i>0.7179</i> |
| <i>Likelihood ratio</i> | <i>0.143609</i> | <i>1</i> | <i>0.7047</i> |

Source: Eviews output results (2010 -2017)

As it can be seen from t, F- and χ^2 versions of the test which are presented in the above rows respectively, there is limited evidence for non-linearity in the regression equation (the p-values indicate that the test statistics are insignificant even at the 10%). So it would be concluded that the model specification is linear and thus, do not reject null hypothesis H_0 which states the model specification is correct.

4.7 Model Selection: Choosing Random Effect versus Fixed Effect Models

There are two classes of panel estimator approaches that can be employed in financial research: fixed effect (FEM) and random effect models (REM). Even if this two approaches end up with nearly the same result, there are situations that they will deviate widely. To decide whether individual effects are fixed or random, a Hausman specification test was conducted and the result had provided evidence in favor of the random effect model as presented in Table 4.8 (p-value for tests is 100% which is greater than 5% for the Model and supports recommendation that the random effects method is an efficient estimator for the study model.

Table 4.8- Correlated Random Effects - Hausman Test

Equation: EQ01

Test cross-section random effects

| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
|----------------------|-------------------|--------------|--------|
| Cross-section random | 0.000000 | 7 | 1.0000 |

Source: Eviews output results (2010 -2017)

4.8 Results of Regression Analysis and Interpretation

4.8.1 Results of Regression Analysis

This section presents the regression results that examine determinants of lending rates of commercial banks in Ethiopia. To identify the appropriate methodology, the study had performed Hausman test. It is used to test whether fixed-effect model versus the random effect model is the best model and accordingly the test results show that random effect model is appropriate.

The operational panel regression model used to find the statistically significant determinants of lending rates in Ethiopian commercial banks was;

$$LR_{it} = \beta_0 + \beta_1(OPE)_{it} + \beta_2(DR)_{it} - \beta_3(NII)_{it} + \beta_4(LIQ)_{it} - \beta_5(SIZE)_{it} + \beta_6(GDP)_t + \beta_7(INF)_t + \delta + \varepsilon$$

Accordingly, Table 4.9 below presents the result of random effect regression model that examines the impact of explanatory variables on lending rate. Hence, lending rate is explained variable whereas operating expense ratios, deposit rate, non-interest income, liquidity, asset size, economic growth and inflation rate are explanatory variables.

The results of random effect regression model analysis through Eviews 9 software have been shown in the next page.

Table 4.9- Results of random effect regression model

Dependent Variable: LR

Method: Panel EGLS (Cross-section random effects)

Date: 01/10/19 Time: 12:10

Sample: 2010 2017

Periods included: 8

Cross-sections included: 13

Total panel (balanced) observations: 104

Swamy and Arora estimator of component variances

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|------------------------------|-------------|---------------------------|-------------|------------|
| C | 0.053849 | 0.021485 | 2.506353 | 0.0139 |
| OPE | 0.356328 | 0.133976 | 2.659630 | 0.0092** |
| DR | 0.689849 | 0.190067 | 3.629505 | 0.0005** |
| NII | -0.067004 | 0.013334 | -5.025018 | 0.0000** |
| LIQ | 0.045442 | 0.017091 | 2.658884 | 0.0092** |
| SIZE | 0.010119 | 0.003165 | 3.197574 | 0.0019** |
| GDP | 0.042309 | 0.011379 | 3.718244 | 0.0003** |
| INF | -0.030666 | 0.014280 | -2.147466 | 0.0343* |
| <i>Effects Specification</i> | | | <i>S.D.</i> | <i>Rho</i> |
| Cross-section random | | | 0.002463 | 0.0583 |
| Idiosyncratic random | | | 0.009902 | 0.9417 |
| <i>Weighted Statistics</i> | | | | |
| <i>R-squared</i> | 0.614504 | <i>Mean dependent var</i> | 0.099064 | |
| <i>Adjusted R-squared</i> | 0.586395 | <i>S.D. dependent var</i> | 0.015116 | |
| <i>S.E. of regression</i> | 0.009721 | <i>Sum squared resid</i> | 0.009073 | |
| <i>F-statistic</i> | 21.86140 | <i>Durbin-Watson stat</i> | 1.867461 | |
| <i>Prob(F-statistic)</i> | 0.000000 | | | |
| <i>Unweighted Statistics</i> | | | | |
| <i>R-squared</i> | 0.615057 | <i>Mean dependent var</i> | 0.121118 | |
| <i>Sum squared resid</i> | 0.009443 | <i>Durbin-Watson stat</i> | 1.794177 | |

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

Source: Eviews output results (2010 -2017)

Thus, the model applied on this study through Ordinary Least Square (OLS) was:

$$LR=0.054+0.356OPE+0.689DR-0.067NII+0.045LIQ+0.01SIZE+0.0423GDP- 0.03INF + \delta + \epsilon$$

4.8.2 Interpretation of R-Squared, Adjusted R-Squared and F-Statistic

4.8.2.1 Interpretation of R-Squared and Adjusted R-Squared

Whereas R^2 tell us how much variation in the dependent variable is accounted for by the regression model, the adjusted value tells us how much variance in the dependent variable would be accounted for if the model had been derived from the population from which the sample was taken. Specifically, it reflects the goodness of fit of the model to the population taking into account the sample size and the number of predictors used (Brooks, 2014).

The R^2 measures the success of the regression in predicting the values of the dependent variable in the sample. The statistic will equal one if the regression fits perfectly, and zero if it fits no better than the simple mean of the dependent variable. There is a rule of thumb which can be used to determine the R^2 value is as follows: 0.1: poor fit, 0.11 to 0.30: modest fit, 0.31 to 0.50: moderate fit, >0.50: strong fit (Muijs, 2004). Here, in this study, the output of the econometrics model by random effect shows that strong explanatory power of the model, hence, an R-squared coefficient of 0.614504 has been obtained from the estimated regression model; revealing that 61.45% of variation in lending rate is explained by the selected explanatory variables (operating expense ratio, deposit rate, non-interest income, liquidity risk, asset size, gross domestic product and inflation rate).

An adjusted R-Squared value which takes into account the loss of degrees of freedom associated with adding extra variables were inferred to see the explanatory powers of the model and it is an output in which we shall use for better interpretation. It can be interpreted as the fraction of the variance of the dependent variable explained by the independent variables. Here in the study R^2 of 58.64% indicates that the formula is strongly fit for predicting the lending interest of Ethiopian commercial banks. This indicates that 58.64% of changes that occur in the dependent variable lending rate are attributable to the independent variables.

The other factors such as loan loss provisions, cash reserve requirement, exchange rate, management style, differences in the skills of workforce and other remaining factors that were not included in the model but could help in explaining lending rates can account for the remaining 41.36%.

4.8.2.2 Interpretation of F-Statistics

The F-statistics tests the fitness of the model and a recommended F-statistics should be greater than 5 for it to be considered fit. The regression F-statistic takes a value of 21.86 which is greater than 5 the model was fit for estimation.

Furthermore, F-statistics tests for the joint impact of all explanatory variables on the dependent variables. A corresponding p-value of zero attached to the test statistic shows that the null hypothesis that all of the slope parameters are jointly zero should be rejected even at 1% level of significance. This implies that all selected explanatory variables can jointly affect the level lending rate of commercial banks.

4.8.3 Interpretation of Regression Results

In this section, the relationship between the dependent variable and each independent variable were discussed on the basis of the findings on this study. The dependant variable was average lending rate of Ethiopian commercial banks whereas regressor variables were operating expense ratios, deposit rate, non-interest income, liquidity, asset size, economic growth and inflation rate.

In the regression output, beta coefficient may be negative or positive; beta indicates that the level of influence of each independent variable on the dependent variable. The positive beta coefficient means that variable has a positive effect on the dependent variable, and a negative coefficient means it has a negative effect on the dependant variable. It informs us on average when independent variable increases by one unit the dependent variable increases/decreases by beta amount but the independent variables should be statistically significant.

The regression result of a random effect model in the above table 4.9 reveals that operating expense ratios, deposit rate, liquidity, asset size and economic growth have positive effect on lending rate while non-interest income and inflation have negative effect on lending rate. Thus, outputs of regression results show that bank specific factors and macroeconomic factors jointly determine the variability of lending interest rate of Ethiopian commercial banks.

A. Operating Expense (OPE) on Lending Rate

Operational costs reflect variations in cost of capital, employment, and wage levels. The expansion of retail banking products, increasing retail branch networks and rising price of labor force contributed much for rising of operational costs. Inefficiency in bank operations may be shifted to bank customers through widening lending rates.

The coefficient of operating expense in regression model displays a positive relationship with the bank's lending rate and it is statistically significant even at 1 percent significance level. This result implies that banks increase their lending interest rate when their operating cost increases in order to cover additional costs. Banks that are not able to keep their overhead costs at low levels will charge high lending interest rate from borrowers in order to compensate for the extra costs of operations.

This result is consistent with economic theory which premises a positive relationship between the bank lending interest rate and operating expenses. The statistically significant impact of operating expense on lending rate is in line with hypothesis. In the Ethiopian commercial banks, the ratio of operating expense (non-interest expense) to total assets has an estimated coefficient of 0.356 which means that; holding other variables constant, on average one unit increase in operating expense results in 0.356 units increase in lending interest rates passed to borrowers by setting high loan prices.

B. Deposit Rate (DR) on Lending Rate

The result of random effect regression model in table 4.9 indicated that deposit rate has a positive in its relationship with the bank's lending rate and it is statistically significant even at 1% significance level. This result implies that lending interest rate increases when deposit rate increases. Thus, the result is in accordance with the second research hypothesis which states deposit rate has positive and significant impact on lending rate.

This result is consistent with economic theory which premises a positive relationship between the bank lending interest rate and deposit interest rate as creditors pass out their input cost of funds to borrowers.

Economic magnitude of the variable is the largest among the explanatory variables suggesting that, controlling other factors constant; on average one unit increase in deposit rate causes the lending rate to rise by 0.689 units and the relationship is statistically significant at 1% significance level.

C. Non-Interest Income (NII) on Lending Rate

The coefficient of non-interest income on random effect regression model displays a negative relationship with the bank's lending rate and the relationship is statistically significant even at 1% significance level. This result is in accordance with the third research hypothesis which states non-interest income has negative and significant impact on lending rate. This indicates that banks with a better income diversification have the leverage to reduce lending interest rate and improve the efficiency of the financial system.

The statistically significant impact of non-interest income (NII) on lending interest rate is in line with hypothesis. The ratio of non-interest income to operating income has an estimated coefficient of -0.067 in the lending interest rate regression which means that, holding other factors constant, on average a unit increase in NII results in reduction of lending interest rate by 0.067 units that is passed to borrowers by setting lower loan prices and the relationship is statistically significant at 1% significance level.

D. Liquidity (LIQ) on Lending Rate

The result of random effect regression model displays the coefficient of liquidity is positive and statistically significant at 1% significance level, indicating higher lending interest rate for banks with a higher proportion of liquid assets. This regression outcome is in accordance with the fourth research hypothesis which has been hypothesized as liquidity has positive and significant impact on lending rate. The high level liquidity arises mainly from the inability or reluctance of commercial banks to extend risky loans at competitive rates or protecting of providing credit.

Banks that either decide or required by regulation to hold a high proportion of their assets in the form of liquid assets seem to charge higher lending rates. This can be interpreted as banks' response to the fact that in holding higher liquidity ratios, banks forego a return on such assets or incur more opportunity costs which they pass to borrowers in the form of higher loan prices.

The statistically significant impact of liquidity risk on lending rate is in line with hypothesis. Accordingly, the liquidity proxied by liquid assets to total assets has an estimated coefficient of 0.045 in the lending rate regression, which means that, holding other variables constant, an average increase of liquidity ratio in one unit results in 0.045 units' increases in bank lending interest rate passed on borrowers and the relationship is statistically significant at 1% significance level.

E. Asset Size (SIZE) on Lending Rate

The random effect regression result of this variable indicates a positive relationship with the dependent variable and it is statistically significant even at 1% in significance level. This regression result is not in line with the research hypothesis which has been formulated as total asset size of banks has negative and significant impact on lending rate. The result shows that, larger banks in terms of total assets tend to charge high lending rate as compared to smaller banks. The evidence here suggests that, large banks do not benefit from the scale of economies which will result in lower cost and lead to lower lending rate. Banks may be suffering from diseconomies of scales which have contributed to the high cost and lending rate. Generally, large banks charge high lending rate to compensate for their investment in technology and branch networks. In Ethiopia, the largest commercial banks like CBE have the largest branch networks and have made significant investment in technology. In respect to the model specification, bank size was proxied by the natural logarithm of assets. This finding is inconsistent with theories that are emphasizing the importance of economies of scale effects. Due to increased economies of scale, banks that maintain sufficient asset should benefit from their size and have lower lending rates. However, to the extent that bank size indicates control of the market in the loan markets, a positive relationship between interest rate and bank size should not be surprising.

The estimated coefficient 0.010119 of bank size on regression result was interpreted as holding other factors constant; on average one percentage increase in asset size causes 1.01% increase in lending interest rate of Ethiopian commercial banks passed to borrowers by setting higher loan rates and the relationship is statistically significant even at 1% significance level.

F. Gross Domestic Product on Lending Rate

The coefficient of GDP on regression result of a random effect model is positive and significant showing a positive relationship with lending interest rate. The result is consistent with the initial hypothesis developed by the researcher. An economy may experience business cycles of a boom or recession at different times. Business cycles are measured by the changes in growth of gross domestic product of an economy. High GDP levels resemble a boom in the economy and low GDP levels show that the economy is experiencing difficulties at that time. In a situation where there is an increase in economic condition will result in an increase in demand for loan which will lead to high rate on the loan. On the other hand, if the economic condition leads to low demand for credit because many people now have money with them will result in low demand for credit will lead to low lending rate. As the growth in the GDP represents an increase in production and economic capacity in a nation, it can have effect in increasing lending rate by passing it on borrowers. Thus, an increase in economic activity leads to excess demand for loans forcing banks to increase lending rates

The statistically significant impact of GDP on lending rate is in line with hypothesis. In the Ethiopian commercial banks, the real growth in gross domestic product has an estimated coefficient 0.0423 in the lending rate, which means that, controlling other factors constant, a one unit increase in economic activity leads to 0.0423 units increase in lending rate of commercial banks in Ethiopia and the relationship is statistically significant even at 1% significance level.

G. Inflation on Lending Rate

Inflation is persistent increase in price level in an economy. From a theoretical standpoint, there is a positive relationship between inflation and banks' lending rate i.e. high inflation rates are generally associated with high loan interest rates. However, the random effect regression result of this study has displayed the negative relationship between lending interest rate and inflation. This indicates that the interest income of commercial banks in Ethiopia is negatively affected by inflation. The result is inconsistent with existing studies and not in line with theories and initially formulated hypothesis.

Perry, 1992 argues that the effects of inflation on bank interest depend on whether inflation is anticipated or unanticipated. If inflation is anticipated, then the banks adjust interest rate accordingly, thereby increasing the interest rate margins. On the other hand, if inflation is not anticipated, then banks may be slow in adjusting their interest rates and so may affect the interest margin negatively because of increased costs occasion by inflation.

Some existing related studies conducted on interest rate margin have found negative relationship between inflation and interest margins. Abreu & Mendes, 2002 found negative relationship between inflation and interest margins on a cross-country study of Portugal, Spain, France, and Germany. (Maria & Agoraki, 2010) also found a negative relationship between inflation and net interest margin on South Eastern Europe countries. (Martinez & Mody, 2004) showed that inflation has a negative impact in Latin-American banks margins. (Samy, 2003) indicated a negative relation between inflation and interest margin of Tunisia banks.

In the Ethiopian commercial banks, inflation has an estimated coefficient -0.0306 in the lending rate, which means that, controlling other factors constant, a one unit increase in inflation rate causes reduction of lending rate by 0.0306 and the relationship is statistically significant at 5% significance level. Even though, inflation brings higher costs and higher income; it seems that costs increase more than do revenues in the case of Ethiopian Commercial Banks. Thus, negative coefficient shows that inflation happening in Ethiopia is unanticipated that increases their cost of doing business and erodes the real interest income which in turn reduces lending rate.

4.9 Summary

This has chapter discussed the results of the study regarding to the determinant of lending rate in Ethiopia banking sector. Trends of average lending rate, descriptive statistics, and diagnostic tests for classical linear regression model assumptions were presented.

The trend analysis of lending rate of commercial banks in Ethiopia shows an upward sloping in the study period from 2010 to 2017 under consideration. The descriptive statistics confirmed that data are in a good level of consistency and stability in distribution. Following the descriptive statistics, tests for normality, heteroscedasticity, multicollinearity and autocorrelation problems were checked.

Eventually, the result shows that bank lending interest rate in Ethiopia were mainly driven by bank specific factors and macroeconomic variables. From the results, all bank specific factors and macroeconomic variables used in the study had the greatest influence on determining price of loan. The result of this finding is summarized in the following table 4.10.

Table 4.10 Summary of actual and expected signs of explanatory variables on the dependent variable

| <i>S. No.</i> | <i>Explanatory Variables</i> | <i>Predicted sign and impact</i> | <i>Actual impact and Sign</i> |
|---------------|--------------------------------|----------------------------------|-------------------------------|
| 1 | <i>Operating expense ratio</i> | <i>Positive and sig.</i> | <i>Positive and Sig.</i> |
| 2 | <i>Deposit rate</i> | <i>Positive and sig.</i> | <i>Positive and Sig.</i> |
| 3 | <i>Non-interest income</i> | <i>Negative and sig.</i> | <i>Negative and Sig.</i> |
| 4 | <i>Liquidity</i> | <i>Positive and sig.</i> | <i>Positive and Sig.</i> |
| 5 | <i>Bank size</i> | <i>Negative and sig.</i> | <i>Positive and Sig.</i> |
| 6 | <i>Gross domestic product</i> | <i>Positive and sig.</i> | <i>Positive and Sig.</i> |
| 7 | <i>Inflation</i> | <i>Positive and sig.</i> | <i>Negative and sig.</i> |

Note: ✓ *Sig- Statistically significant*
✓ *Insig- Statistically insignificant*

CHAPTER FIVE

5. SUMMARY OF FINDINGS, CONCLUSIONS & RECOMMENDATIONS

5.1 Introduction

This chapter presents the overall summary of the research by summing the main findings of the analysis part, conclusion, and recommendation of the researcher and give future research directions. Accordingly, the chapter starts by outlining the summary of findings and followed by conclusions of the study in accordance with the study results. It also gives an insight on the policy recommendations as well as suggestions for future studies.

5.2 Summary of Findings of the Study

The objective of the study was identifying the determinants of lending interest rates of commercial banks operating in Ethiopia. For the purpose of this study, the researcher has used average lending interest rate of each commercial bank as explained variable which was calculated as ratio of interest income to loans and advances from the selected banks income statement and balance sheet. On the other hand the researcher had used operating cost ratio, deposit interest rate, non-interest income, liquidity, bank size, gross domestic product and inflation as explanatory variables. The hypothesis of the study was that bank lending interest rate is significantly influenced by internal bank specific and external macroeconomic factors.

The literatures differ about the category of factors that had the greatest influence on lending interest rate. Some of the studies argue that the main determinants of lending rate are bank-specific factors; whereas others claim that the macroeconomic factors are the most important variables that explain the level of lending interest rate. Therefore, there is a continuous debate on the key determinants of lending rate in different countries. Cognizant of the need for further research in the area, the current study had proposed a model based on literatures to analyze the effects of bank specific and macroeconomic factors on lending interest rate of Ethiopian Commercial Banks.

An explanatory research design was adopted to explain the casual relationships between the variables. The study employed quantitative methods on secondary data sourced from financial statements of banks and NBE publications for macro-economic variables.

This study has identified a number of variables that have important bearing on lending rates in Ethiopia. Both the internal (i.e. bank-specific variables) and external factors used in this study have found joint influence on lending rate. Overall results from the regression analysis estimated by random effect regression model revealed that operating cost ratio, deposit interest rate, liquidity, bank size and gross domestic product had positive and significant effect on lending rate at different significance level. On the other hand, non-interest income and inflation affect lending rate of Ethiopian commercial banks negatively.

With respect to the bank specific variables, the study finds that five bank specific variables operating cost ratio, deposit interest rate, non-interest income, liquidity and bank size were statistically significant and important factors that affect lending rate of Ethiopia commercial banks. The empirical result also reveals that macroeconomic variables GDP and inflation rate are important determinants of lending rate in Ethiopia commercial banks.

Generally, most of the findings were in line with postulates that bank specific variables and macroeconomic variables have an impact on bank lending interest rate. Specific findings on each of the factors are presented as follows.

5.3 Conclusions

- ✓ Operating cost ratio variable has positive and significant relationship with lending rate at 1% significance level. This means that less efficient banks (that is, banks with higher operating costs) charge higher interest rates on loans (or pay lower rates on deposits), therefore passing those costs onto customers. Recently banks have been more aggressive towards the expansion in more geographical areas by opening new branches which has caused an increase in the level of operating expenses; resulting increase in lending interest rate.
- ✓ The coefficient of deposit rate variable in the model is positive and statistically significant at 1% level and it implies that there is a positive relationship between lending and deposit interest rates. Interest on deposit is cost of borrowing that banks pay for the money that they have mobilized through deposit. Thus, banks pass the cost to deficit units by setting higher lending rates.
- ✓ Non-interest income of banks has a negative and significant relationship with lending rate even at 1% significance level suggesting that banks decrease their lending rate when they are more reliant on fee generating products.

- ✓ Liquidity of banks has positive and statistically significant at 1% significance level, indicating higher lending interest rate for banks with a higher proportion of liquid assets. The positive effect of liquidity on bank's lending interest rate is a scenario where banks with excess holdings of liquid assets incur more opportunity costs which they pass to borrowers in the form of higher loan prices.
- ✓ In regarding to bank size which is proxied by size of an asset, the study showed that the lending interest rate increases when the asset size of banks increases. The relationship is positive and it is significant at 1% significance level. Larger banks in terms of total asset tend to have higher lending rates since they have a market power to set higher price.
- ✓ GDP has a positive and significant relationship with lending interest rate event at 1% significance level. In a situation where there is an increase in economic condition results in an increase in demand for loan which will lead to high rate on the loan. As the growth in the GDP represents an increase in production and economic capacity in a nation, it can have effect in increasing lending rate by widening demand for finance.
- ✓ Regarding inflation, the result showed as it has negative relationship with lending rate and the relationship is statistically significant at 5% significance level. The outcome is different from the expected sign which implies that inflation affects lending rate of banks negatively.

To sum up, this study has identified a number of variables that have important impact on lending rates in Ethiopia. The findings reveal that lending rates are to a significant extent positively impacted by variables associated with higher cost structures or lower income. These findings indicate that bank policies that reduce bank costs and strategies that increase non-interest income will help to lower the cost of borrowing.

The study to this end concluded that the factors determining lending interest rate are operating cost ratio, deposit interest rate, non-interest income, liquidity, asset size of banks, GDP and inflation. It must however be stated that apart from these factors there are other explanatory factors that this study could not cover.

5.4 Recommendations

On the basis of the above findings, it is possible to propose the following recommendations. The recommendations will help commercial banks to focus on selected areas of emphasis so as to set optimal loan price.

- Commercial banks need to improve on their operational efficiency for setting lower bank lending rate. Improving cost efficiency by reducing controllable operating expenses using appropriate cost reduction strategies will help to bring bank loan price down. This can be done by moving towards multi-channel banking products such as mobile banking, internet banking, agent banking and effective utilization of Automatic Teller Machine (ATM) facilities rather than the conventional banking methods which are very expensive.
- When banks mobilize deposit from customers, they pay interest on these deposits (i.e. saving and fixed time deposits) to ensure that deposits do not lose value over the period that the money is kept with the bank. The interest on deposits which is termed as borrowing rate is expensive for time deposits than saving deposits. Thus, commercial banks should strategize on how to attract and retain more saving deposits rather than focusing on mobilization of fixed time deposits so as to reduce interest expense thereby further improve their lending rates.
- The results of the study were consistent with the hypothesis that banks decrease their lending rate when they are more reliant on fee generating products. Furthermore, the higher lending rate set by banks to improve profitability has an adverse contra impact on the repayment of the loan causing default thereby resulting in revenue loss to the banks. Thus, banks are advised diversify their income across non-interest income in addition to interest income.

5.5 Suggestions for Further Studies

The prime focus of this research was identifying determinant factors of lending interest rate in the case of commercial banks in Ethiopia using selected variables. However, there are so many bank specific, industries specific and macroeconomic variables that were not included in this study. Thus, future researchers are recommended to undertake similar study by considering additional variables such as ownership structure, loan loss provisions, management risk aversion, exchange rate and the like on the same banks. Such researches are useful to validate findings of the current study. Furthermore, as the study had covered short sample period and the limited number of banks, there is a need to extend the analysis in both these directions by considering long sample period and the newly emerging banks.

References

- Abreu, M., & Mendes, V. (2002). *Commercial Bank Interest Margins and Profitability Evidence for Some EU Countries*. CISEP No. 830.
- Achou, FT & Tenguh, CN (2008), *Bank performance and credit risk management*, MA Degree Project in Finance, Skovode University.
- Adedoyin and Sobodun (1996). *Commercial Banks Lending Activities in Nigeria*, *Nigerian Financial Review*.
- Admas, J. T., Robert, R., & White, D. (2007). *Research Methods for Graduate Business and Social Science Students*.
- Ahmet, U., & Hakan, E. (2010). *Determinants of the Net Interest Margins of Banks in Turkey*. *Journal of Economic and Social Research*, 12(2), 101-118.
- Ahokossi, C. (2013). *Determinants of Bank Interest Margins in Sub-Saharan Africa*. IMF Working Paper Wp/13/34.
- Alidu Uzeru (2012). *Determinants of Lending Rates in Ghana*.
- Ansari (2015). *Determinants of commercial banks loan pricing in India*. Analysis using dynamic model.
- Bekaert, G. (1998). *Regime Switches in Interest Rates*. Cambridge, Mass: National Bureau of Economic Research.
- Belay G. (2015). *Determinants of Cost of Financial Intermediation: Empirical Study on Commercial Banks in Ethiopia*, Addis Ababa University, Addis Ababa, Ethiopia.
- Branko Krnic (2014). *Determinants of lending interest rates granted to companies in Croatia*, university of Applied Sciences, Zagreb, Croatia.
- Brock, P. L., and L. Rojas-Suarez (2000), "Understanding the Behavior of Bank Spreads in Latin America", *Journal of Development Economics*, 63, 113-134.
- Brooks, C. (2014). *Introductory Econometrics of Finance 3rd ed.* the ICMA Center, University of Reading, Cambridge University press.
- Caplan, B. (2000). *Rational expectation*. George Mason University: Department of economics.
- Carbo S. and Rodriguez, F. (2005). "Pricing Strategies in European Banking: Specialization, Technology and inter-temporal Smoothing, in Balling", *Competition and Profitability in European Financial Services*, *Studies in the European Economy*, London.

- Chirwa, E. W. (2001). *Market Structure, Liberalization and Performance in the Malawian Banking Industry*. African Economic Research Paper, No. 108, Nairobi.
- Chirwa, E.W., & Mlachila, M. (2004). *Financial reforms and interest rate spreads in the commercial banking system in Malawi*.
- Chodechai, S (2004), *Determinants of Bank Lending in Thailand: An Empirical Examination for the years 1992 – 1996*.
- Claessens, S., Demirgüç-Kunt, A., & Huizinga, H. (2001). *How does Foreign Entry affect Domestic Banking? Journal of Banking and Finance* (25), 891-911.
- Creswell, J. W. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. California: Sage Publications Inc.
- Diamond, D W. and Rajan, R G (2005). 'Liquidity shortages and banking crisis', *Journal of Finance*.
- Demirgüç-Kunt, A., & Huizinga, H. (1999). *Determinants of commercial bank interest margins and profitability: some international evidence. The World Bank Economic Review*, 13 (2), 379-408. *Determination in an Error Correction Model*
- Drakos, K. (2002). *The Dealership Model for Interest Margins: The Case of the Greek Banking Industry. Journal of Emerging Finance* (1), 75-98.
- Fridah Gatwiri Kinyuru (2011). *Determinants of Lending Rate of Commercial Banks in Kenya*.
- Friedman, B. M., & Kuttner, K. N. (1991). *Why does the paper-bill spread predict real economic activity? Cambridge, MA: National Bureau of Economic Research*.
- Gambacorta, L., (2008), "How Do Banks Set Interest Rates?" *European Economic Review*, 52 (5), 792–819.
- Georgievska, L. R. Kabashi, N. Manova-Trajkovska, A. Mitreska, and M. Vaskov (2010), "Determinants of Lending Interest Rates and Interest Rate Spreads", *Special Conference Paper, Bank of Greece*.
- Gujarati, D. (2004). *Basic Econometric*, 4th ed. USA, Mc Graw Hill.
- Hair, J. W. (2006). *Multivariate Data Analysis*. New Jersey: Pearson.
- Hassan, H. (2012). *The Determinants of Bank Net Interest Margin: Evidence from the Lebanese Banking Sector. Journal of Money, Investment and Banking Faculty of Business Administration and Economics Notre Dame University*.

- *Hendric S and Williamson P. (1996): The economies of financial markets Oxford University press.*
- *Ho, T. S., & Saunders, A. (1981). The determinants of bank interest margins: theory and empirical evidence. Journal of Financial and Quantitative analysis, 16 (04).*
- *Keynes, J. (1936). "The General Theory of Employment, Interest and Money", United Kingdom: Palgrave Macmillan.*
- *Koch, T., MacDonald, W., and Scott, S. (2006), Bank management.*
- *Lerner, E. M. (1981), "Discussion: the Determinants of Banks Interest Margins: Theory and Empirical Evidence", Journal of Financial and Quantitative Analysis, Vol. 16, No. 4, 601-602.*
- *Liebeg and Schwaiger (2006), Determinants of Bank Interest Margins in Central and Eastern Europe, Financial Stability Report, No 14, Oesterreichische Nationalbank (Central Bank of Austria)*
- *Ljupka Georgievska; Rilind Kabashi; Trajkovska; Ana Mitreska and Mihajlo Vaskov (2010). Determinants of lending rates and interest rate spreads in Macedonia.*
- *Malhotra, N. (2007.). Marketing Research: An applied Orientation, 5th Edition. New Delhi.*
- *Maria, K., & Agoraki. (2010). The determinants of Net Interest Margin during Transition. Department of Accounting & Finance, Athens University of Economics and Business.*
- *Martinez, P., & Mody, A. (2004). How Foreign Participation and Market Concentration Impact Bank Spreads: Evidence from Latin America. Journal of Money, Credit and Banking, 36(3).*
- *Maudos, J., & Guevara, F. (2004). Factors Explaining the Interest Margin in the Banking. Journal of Banking and Finance, 28(9), 2259–2281.*
- *Mbao, F.Z., Kapembwa, C., Mooka, O., Rasmussen, T., & Sichalwe, J. (2014).Determinants of bank lending rates in Zambia: A balance sheet approach.*
- *McCarthy, MG, Schneider, DK and Tib, SL (2010), 'Investments and loans reported by the ten largest U.S banks,' Journal of Bank Accounting and Finance.*
- *Mekbib S. (2016). Determinants of Liquidity in Commercial Banks of Ethiopia: The Case of Selected Private Banks, Addis Ababa University, Addis Ababa, Ethiopia.*
- *Mensah, S., & Abor, J. Y. (2014). Agency Conflict and Bank Interest Spreads in Ghana. African Development Review, 26 (4), 549-560.*

- *Meshesha D. (2016). Determinants of Net Interest Margin in the Ethiopian Banking Industry Empirical Study on Commercial Banks in Ethiopia, Addis Ababa University, Addis Ababa, Ethiopia.*
- *Mwangi Anthony Chege (2014). Effect of interest rates on non-performing loans in commercial banks in Kenya.*
- *N. Gregory Mankiw (2001). The Science of Macroeconomics (5th edition).*
- *NBE directive (2014). Liquidity Requirement Directive No. SBB/57/2014. Addis Ababa, National Bank of Ethiopia.*
- *Perry, P. (1992). Do Banks Gain or Lose From Inflation? Journal of Retail Banking, 14 (2), 25-30.*
- *Rose, P.S. (2003). The determinants of interest rates: Competing ideas in Capital markets: Financial institutions and instruments in a global marketplace (8thed.). McGraw Hill/Irwin.*
- *Samy, B. (2003). The Determinants of the Tunisian Banking industry Profitability: Panel Evidence. Université Libre de Tunis, 2003.*
- *Sheriff, I. M. & Amoako, G. K. (2014). Macroeconomic Determinants of Interest Rate Spread in Ghana: Evidence from ARDL Modeling Approach. Journal of Finance and Bank Management.*
- *Sime, Z. E., Wolde, K. T., & Ketama, T. A. (2013). Competition in Ethiopian Banking Industry. African Journal of Economics.*
- *Stiglitz, J., & Weiss, A. (1981). Credit Rationing in Markets with imperfect information. The American Economic Review 71(3).*
- *Stiroh K. J. (2004). Diversification in Banking: Is the Non-interest Income the Answer?. Journal of Money, Credit and Banking 36, 853-882.*
- *Thompson, M.A. (2006). Asymmetric adjustment in the prime lending-deposit rate spread. Review of Financial Economics.*
- *Yuga Raj Bhattarai (2015), Determinants of Lending Interest Rates of Nepalese Commercial Banks. Economic Journal of Development Issues.*

APPENDICES

Appendix I: Raw Data

| Year | Bank | LR | OPE | DR | NII | LIQ | SIZE | GDP | INF |
|-------------|-------------|-----------|------------|-----------|------------|------------|-------------|------------|------------|
| 2010 | AWB | 0.1012 | 0.0228 | 0.0328 | 0.5583 | 0.5088 | 3.9001 | (0.0772) | 0.0815 |
| 2011 | AWB | 0.1027 | 0.0211 | 0.0366 | 0.5745 | 0.4002 | 4.0050 | 0.0674 | 0.3325 |
| 2012 | AWB | 0.1249 | 0.0247 | 0.0404 | 0.3980 | 0.2648 | 4.0769 | 0.3555 | 0.2412 |
| 2013 | AWB | 0.1182 | 0.0319 | 0.0392 | 0.4020 | 0.2404 | 4.1720 | 0.1001 | 0.0808 |
| 2014 | AWB | 0.1214 | 0.0308 | 0.0417 | 0.4331 | 0.2527 | 4.3017 | 0.1671 | 0.0740 |
| 2015 | AWB | 0.1192 | 0.0336 | 0.0447 | 0.3648 | 0.1626 | 4.3778 | 0.1592 | 0.1011 |
| 2016 | AWB | 0.1264 | 0.0357 | 0.0457 | 0.3192 | 0.1956 | 4.4714 | 0.1324 | 0.0726 |
| 2017 | AWB | 0.1163 | 0.0357 | 0.0409 | 0.3125 | 0.1668 | 4.6230 | 0.1036 | 0.0985 |
| 2010 | BOA | 0.0897 | 0.0231 | 0.0325 | 0.4416 | 0.4717 | 3.7979 | (0.0772) | 0.0815 |
| 2011 | BOA | 0.1161 | 0.0269 | 0.0365 | 0.3980 | 0.3979 | 3.8620 | 0.0674 | 0.3325 |
| 2012 | BOA | 0.1310 | 0.0274 | 0.0405 | 0.3120 | 0.3062 | 3.9159 | 0.3555 | 0.2412 |
| 2013 | BOA | 0.1079 | 0.0223 | 0.0324 | 0.3120 | 0.1946 | 4.0056 | 0.1001 | 0.0808 |
| 2014 | BOA | 0.1451 | 0.0306 | 0.0436 | 0.3804 | 0.2435 | 4.0522 | 0.1671 | 0.0740 |
| 2015 | BOA | 0.1445 | 0.0338 | 0.0434 | 0.2930 | 0.4590 | 4.1357 | 0.1592 | 0.1011 |
| 2016 | BOA | 0.1370 | 0.0424 | 0.0442 | 0.3279 | 0.1844 | 4.2260 | 0.1324 | 0.0726 |
| 2017 | BOA | 0.1142 | 0.0425 | 0.0402 | 0.3315 | 0.1358 | 4.4035 | 0.1036 | 0.0985 |
| 2010 | BEB | 0.1045 | 0.0328 | 0.0414 | 0.2925 | 0.5187 | 2.5792 | (0.0772) | 0.0815 |
| 2011 | BEB | 0.1039 | 0.0257 | 0.0348 | 0.4928 | 0.5789 | 2.9609 | 0.0674 | 0.3325 |
| 2012 | BEB | 0.1171 | 0.0269 | 0.0473 | 0.4711 | 0.4421 | 3.1089 | 0.3555 | 0.2412 |
| 2013 | BEB | 0.0928 | 0.0228 | 0.0383 | 0.3884 | 0.3367 | 3.3419 | 0.1001 | 0.0808 |
| 2014 | BEB | 0.1440 | 0.0413 | 0.0443 | 0.3399 | 0.3489 | 3.4492 | 0.1671 | 0.0740 |
| 2015 | BEB | 0.1122 | 0.0388 | 0.0359 | 0.4357 | 0.2980 | 3.6203 | 0.1592 | 0.1011 |
| 2016 | BEB | 0.1244 | 0.0415 | 0.0383 | 0.4144 | 0.2163 | 3.8571 | 0.1324 | 0.0726 |
| 2017 | BEB | 0.1309 | 0.0444 | 0.0402 | 0.4094 | 0.2288 | 4.0207 | 0.1036 | 0.0985 |
| 2010 | BUB | 0.0969 | 0.0375 | 0.0354 | 0.5769 | 0.5218 | 2.6813 | (0.0772) | 0.0815 |

Determinants of Bank Lending Rates on Commercial Banks in Ethiopia

| | | | | | | | | | |
|------|-----|--------|--------|--------|--------|--------|--------|----------|--------|
| 2011 | BUB | 0.0941 | 0.0430 | 0.0350 | 0.5365 | 0.4842 | 2.8926 | 0.0674 | 0.3325 |
| 2012 | BUB | 0.0980 | 0.0349 | 0.0371 | 0.4263 | 0.2956 | 3.1351 | 0.3555 | 0.2412 |
| 2013 | BUB | 0.1289 | 0.0303 | 0.0404 | 0.2954 | 0.2729 | 3.3281 | 0.1001 | 0.0808 |
| 2014 | BUB | 0.1344 | 0.0442 | 0.0372 | 0.3903 | 0.2966 | 3.4788 | 0.1671 | 0.0740 |
| 2015 | BUB | 0.1275 | 0.0467 | 0.0380 | 0.3605 | 0.1821 | 3.6532 | 0.1592 | 0.1011 |
| 2016 | BUB | 0.1352 | 0.0454 | 0.0442 | 0.3318 | 0.1837 | 3.8338 | 0.1324 | 0.0726 |
| 2017 | BUB | 0.1214 | 0.0413 | 0.0457 | 0.3172 | 0.2101 | 3.9921 | 0.1036 | 0.0985 |
| 2010 | CBE | 0.1164 | 0.0127 | 0.0325 | 0.3897 | 0.2103 | 4.8703 | (0.0772) | 0.0815 |
| 2011 | CBE | 0.1163 | 0.0143 | 0.0341 | 0.4164 | 0.2648 | 5.0579 | 0.0674 | 0.3325 |
| 2012 | CBE | 0.1100 | 0.0124 | 0.0339 | 0.4208 | 0.1580 | 5.2009 | 0.3555 | 0.2412 |
| 2013 | CBE | 0.1369 | 0.0141 | 0.0392 | 0.3169 | 0.1801 | 5.2947 | 0.1001 | 0.0808 |
| 2014 | CBE | 0.1414 | 0.0169 | 0.0239 | 0.2907 | 0.1833 | 5.3809 | 0.1671 | 0.0740 |
| 2015 | CBE | 0.1369 | 0.0189 | 0.0387 | 0.2057 | 0.1885 | 5.4746 | 0.1592 | 0.1011 |
| 2016 | CBE | 0.1354 | 0.0193 | 0.0413 | 0.1756 | 0.1798 | 5.5589 | 0.1324 | 0.0726 |
| 2017 | CBE | 0.1485 | 0.0197 | 0.0426 | 0.1726 | 0.1800 | 5.6154 | 0.1036 | 0.0985 |
| 2010 | CBO | 0.1065 | 0.0368 | 0.0326 | 0.4170 | 0.4815 | 3.2476 | (0.0772) | 0.0815 |
| 2011 | CBO | 0.1208 | 0.0324 | 0.0355 | 0.5063 | 0.4867 | 3.3980 | 0.0674 | 0.3325 |
| 2012 | CBO | 0.1262 | 0.0286 | 0.0408 | 0.4340 | 0.3367 | 3.5648 | 0.3555 | 0.2412 |
| 2013 | CBO | 0.1152 | 0.0290 | 0.0313 | 0.5566 | 0.5197 | 3.8155 | 0.1001 | 0.0808 |
| 2014 | CBO | 0.1159 | 0.0416 | 0.0346 | 0.5212 | 0.2513 | 3.8664 | 0.1671 | 0.0740 |
| 2015 | CBO | 0.1069 | 0.0530 | 0.0331 | 0.4277 | 0.2126 | 4.0593 | 0.1592 | 0.1011 |
| 2016 | CBO | 0.1408 | 0.0760 | 0.0421 | 0.2330 | 0.2008 | 4.0264 | 0.1324 | 0.0726 |
| 2017 | CBO | 0.1154 | 0.0483 | 0.0353 | 0.2289 | 0.1967 | 4.2486 | 0.1036 | 0.0985 |
| 2010 | DB | 0.0977 | 0.0209 | 0.0334 | 0.4995 | 0.4254 | 4.0918 | (0.0772) | 0.0815 |
| 2011 | DB | 0.0991 | 0.0223 | 0.0386 | 0.5292 | 0.4247 | 4.1661 | 0.0674 | 0.3325 |
| 2012 | DB | 0.1129 | 0.0241 | 0.0424 | 0.4797 | 0.3296 | 4.2435 | 0.3555 | 0.2412 |
| 2013 | DB | 0.1178 | 0.0260 | 0.0423 | 0.4382 | 0.3069 | 4.2955 | 0.1001 | 0.0808 |

Determinants of Bank Lending Rates on Commercial Banks in Ethiopia

| | | | | | | | | | |
|------|-----|--------|--------|--------|--------|--------|--------|----------|--------|
| 2014 | DB | 0.1210 | 0.0280 | 0.0438 | 0.4681 | 0.2979 | 4.3417 | 0.1671 | 0.0740 |
| 2015 | DB | 0.1248 | 0.0357 | 0.0443 | 0.4377 | 0.2233 | 4.3938 | 0.1592 | 0.1011 |
| 2016 | DB | 0.1219 | 0.0365 | 0.0440 | 0.4433 | 0.2404 | 4.4560 | 0.1324 | 0.0726 |
| 2017 | DB | 0.1169 | 0.0437 | 0.0438 | 0.3938 | 0.1518 | 4.5394 | 0.1036 | 0.0985 |
| 2010 | LIB | 0.0981 | 0.0302 | 0.0316 | 0.4923 | 0.5431 | 3.1347 | (0.0772) | 0.0815 |
| 2011 | LIB | 0.1137 | 0.0288 | 0.0357 | 0.4627 | 0.5048 | 3.2572 | 0.0674 | 0.3325 |
| 2012 | LIB | 0.1211 | 0.0304 | 0.0349 | 0.4731 | 0.4219 | 3.3915 | 0.3555 | 0.2412 |
| 2013 | LIB | 0.1299 | 0.0308 | 0.0374 | 0.4312 | 0.3343 | 3.4687 | 0.1001 | 0.0808 |
| 2014 | LIB | 0.1357 | 0.0390 | 0.0387 | 0.3886 | 0.3127 | 3.5579 | 0.1671 | 0.0740 |
| 2015 | LIB | 0.1155 | 0.0524 | 0.0346 | 0.4884 | 0.2620 | 3.7678 | 0.1592 | 0.1011 |
| 2016 | LIB | 0.1225 | 0.0543 | 0.0370 | 0.4108 | 0.2259 | 3.9095 | 0.1324 | 0.0726 |
| 2017 | LIB | 0.1392 | 0.0411 | 0.0345 | 0.2676 | 0.2434 | 4.0404 | 0.1036 | 0.0985 |
| 2010 | NIB | 0.1088 | 0.0304 | 0.0318 | 0.5215 | 0.5139 | 3.7760 | (0.0772) | 0.0815 |
| 2011 | NIB | 0.1255 | 0.0272 | 0.0356 | 0.4931 | 0.5124 | 3.8520 | 0.0674 | 0.3325 |
| 2012 | NIB | 0.1202 | 0.0263 | 0.0398 | 0.4290 | 0.3602 | 3.9178 | 0.3555 | 0.2412 |
| 2013 | NIB | 0.1288 | 0.0300 | 0.0408 | 0.3297 | 0.2466 | 3.9612 | 0.1001 | 0.0808 |
| 2014 | NIB | 0.1055 | 0.0256 | 0.0342 | 0.3297 | 0.1783 | 4.0313 | 0.1671 | 0.0740 |
| 2015 | NIB | 0.1288 | 0.0353 | 0.0443 | 0.2653 | 0.1356 | 4.1224 | 0.1592 | 0.1011 |
| 2016 | NIB | 0.1519 | 0.0345 | 0.0474 | 0.2026 | 0.1881 | 4.1995 | 0.1324 | 0.0726 |
| 2017 | NIB | 0.1401 | 0.0350 | 0.0457 | 0.2300 | 0.1561 | 4.3226 | 0.1036 | 0.0985 |
| 2010 | OIB | 0.0997 | 0.0389 | 0.0250 | 0.6214 | 0.5620 | 3.0487 | (0.0772) | 0.0815 |
| 2011 | OIB | 0.0948 | 0.0326 | 0.0352 | 0.5946 | 0.4332 | 3.2927 | 0.0674 | 0.3325 |
| 2012 | OIB | 0.1216 | 0.0390 | 0.0425 | 0.4661 | 0.3972 | 3.4452 | 0.3555 | 0.2412 |
| 2013 | OIB | 0.1226 | 0.0456 | 0.0347 | 0.4127 | 0.3072 | 3.5923 | 0.1001 | 0.0808 |
| 2014 | OIB | 0.1290 | 0.0388 | 0.0349 | 0.4012 | 0.3031 | 3.7890 | 0.1671 | 0.0740 |
| 2015 | OIB | 0.1099 | 0.0411 | 0.0373 | 0.3229 | 0.1757 | 3.9793 | 0.1592 | 0.1011 |
| 2016 | OIB | 0.1478 | 0.0513 | 0.0366 | 0.2639 | 0.1904 | 4.0524 | 0.1324 | 0.0726 |

Determinants of Bank Lending Rates on Commercial Banks in Ethiopia

| | | | | | | | | | |
|------|-----|--------|--------|--------|--------|--------|--------|----------|--------|
| 2017 | OIB | 0.1293 | 0.0483 | 0.0335 | 0.3904 | 0.2037 | 4.2120 | 0.1036 | 0.0985 |
| 2010 | UB | 0.0997 | 0.0269 | 0.0324 | 0.5084 | 0.5554 | 3.7706 | (0.0772) | 0.0815 |
| 2011 | UB | 0.1064 | 0.0211 | 0.0360 | 0.4626 | 0.4607 | 3.8879 | 0.0674 | 0.3325 |
| 2012 | UB | 0.1300 | 0.0258 | 0.0401 | 0.3763 | 0.3258 | 3.9438 | 0.3555 | 0.2412 |
| 2013 | UB | 0.1301 | 0.0354 | 0.0426 | 0.3361 | 0.2067 | 3.9990 | 0.1001 | 0.0808 |
| 2014 | UB | 0.1433 | 0.0337 | 0.0445 | 0.2541 | 0.2850 | 4.0747 | 0.1671 | 0.0740 |
| 2015 | UB | 0.1399 | 0.0411 | 0.0436 | 0.2893 | 0.1896 | 4.1572 | 0.1592 | 0.1011 |
| 2016 | UB | 0.1456 | 0.0416 | 0.0541 | 0.2674 | 0.1690 | 4.2373 | 0.1324 | 0.0726 |
| 2017 | UB | 0.1307 | 0.0405 | 0.0525 | 0.2296 | 0.1455 | 4.3405 | 0.1036 | 0.0985 |
| 2010 | WB | 0.1041 | 0.0300 | 0.0352 | 0.5627 | 0.5287 | 3.7591 | (0.0772) | 0.0815 |
| 2011 | WB | 0.1133 | 0.0318 | 0.0353 | 0.6136 | 0.5137 | 3.9064 | 0.0674 | 0.3325 |
| 2012 | WB | 0.1270 | 0.0302 | 0.0408 | 0.4805 | 0.3343 | 3.9215 | 0.3555 | 0.2412 |
| 2013 | WB | 0.1277 | 0.0313 | 0.0379 | 0.3845 | 0.2670 | 4.0168 | 0.1001 | 0.0808 |
| 2014 | WB | 0.1458 | 0.0390 | 0.0435 | 0.3825 | 0.1592 | 4.0509 | 0.1671 | 0.0740 |
| 2015 | WB | 0.1406 | 0.0425 | 0.0502 | 0.3564 | 0.1784 | 4.1371 | 0.1592 | 0.1011 |
| 2016 | WB | 0.1364 | 0.0440 | 0.0524 | 0.3319 | 0.1913 | 4.2092 | 0.1324 | 0.0726 |
| 2017 | WB | 0.1314 | 0.0462 | 0.0568 | 0.3724 | 0.1864 | 4.3212 | 0.1036 | 0.0985 |
| 2010 | ZB | 0.0932 | 0.0398 | 0.0423 | 0.7669 | 0.5789 | 3.0235 | (0.0772) | 0.0815 |
| 2011 | ZB | 0.0957 | 0.0344 | 0.0453 | 0.7214 | 0.4382 | 3.2077 | 0.0674 | 0.3325 |
| 2012 | ZB | 0.1034 | 0.0322 | 0.0473 | 0.6143 | 0.3759 | 3.3792 | 0.3555 | 0.2412 |
| 2013 | ZB | 0.1198 | 0.0556 | 0.0535 | 0.6294 | 0.3458 | 3.5117 | 0.1001 | 0.0808 |
| 2014 | ZB | 0.1576 | 0.0307 | 0.0547 | 0.5488 | 0.3806 | 3.5938 | 0.1671 | 0.0740 |
| 2015 | ZB | 0.1217 | 0.0338 | 0.0489 | 0.4769 | 0.2368 | 3.6879 | 0.1592 | 0.1011 |
| 2016 | ZB | 0.1128 | 0.0307 | 0.0525 | 0.4781 | 0.2995 | 3.8677 | 0.1324 | 0.0726 |
| 2017 | ZB | 0.1167 | 0.0326 | 0.0547 | 0.5206 | 0.3182 | 3.9854 | 0.1036 | 0.0985 |

Appendix II Regression Results

Dependent Variable: LR

Method: Panel EGLS (Cross-section random effects)

Date: 01/10/19 Time: 12:10

Sample: 2010 2017

Periods included: 8

Cross-sections included: 13

Total panel (balanced) observations: 104

Swamy and Arora estimator of component variances

| <i>Variable</i> | <i>Coefficient</i> | <i>Std. Error</i> | <i>t-Statistic</i> | <i>Prob.</i> |
|-----------------|--------------------|-------------------|--------------------|---------------|
| <i>C</i> | <i>0.053849</i> | <i>0.021485</i> | <i>2.506353</i> | <i>0.0139</i> |
| <i>OPE</i> | <i>0.356328</i> | <i>0.133976</i> | <i>2.659630</i> | <i>0.0092</i> |
| <i>DR</i> | <i>0.689849</i> | <i>0.190067</i> | <i>3.629505</i> | <i>0.0005</i> |
| <i>NII</i> | <i>-0.067004</i> | <i>0.013334</i> | <i>-5.025018</i> | <i>0.0000</i> |
| <i>LIQ</i> | <i>0.045442</i> | <i>0.017091</i> | <i>2.658884</i> | <i>0.0092</i> |
| <i>SIZE</i> | <i>0.010119</i> | <i>0.003165</i> | <i>3.197574</i> | <i>0.0019</i> |
| <i>GDP</i> | <i>0.042309</i> | <i>0.011379</i> | <i>3.718244</i> | <i>0.0003</i> |
| <i>INF</i> | <i>-0.030666</i> | <i>0.014280</i> | <i>-2.147466</i> | <i>0.0343</i> |

Effects Specification

| | <i>S.D.</i> | <i>Rho</i> |
|-----------------------------|-----------------|---------------|
| <i>Cross-section random</i> | <i>0.002463</i> | <i>0.0583</i> |
| <i>Idiosyncratic random</i> | <i>0.009902</i> | <i>0.9417</i> |

Weighted Statistics

| | | | |
|---------------------------|-----------------|---------------------------|-----------------|
| <i>R-squared</i> | <i>0.614504</i> | <i>Mean dependent var</i> | <i>0.099064</i> |
| <i>Adjusted R-squared</i> | <i>0.586395</i> | <i>S.D. dependent var</i> | <i>0.015116</i> |
| <i>S.E. of regression</i> | <i>0.009721</i> | <i>Sum squared resid</i> | <i>0.009073</i> |
| <i>F-statistic</i> | <i>21.86140</i> | <i>Durbin-Watson stat</i> | <i>1.867461</i> |
| <i>Prob(F-statistic)</i> | <i>0.000000</i> | | |

Unweighted Statistics

| | | | |
|--------------------------|-----------------|---------------------------|-----------------|
| <i>R-squared</i> | <i>0.615057</i> | <i>Mean dependent var</i> | <i>0.121118</i> |
| <i>Sum squared resid</i> | <i>0.009443</i> | <i>Durbin-Watson stat</i> | <i>1.794177</i> |

Appendix III Heteroskedasticity Test: White

Heteroskedasticity Test: White

| | | | |
|----------------------------|----------|----------------------------|--------|
| <i>F-statistic</i> | 0.626980 | <i>Prob. F(7,96)</i> | 0.7325 |
| <i>Obs*R-squared</i> | 4.546731 | <i>Prob. Chi-Square(7)</i> | 0.7151 |
| <i>Scaled explained SS</i> | 4.894253 | <i>Prob. Chi-Square(7)</i> | 0.6729 |

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 01/10/19 Time: 11:16

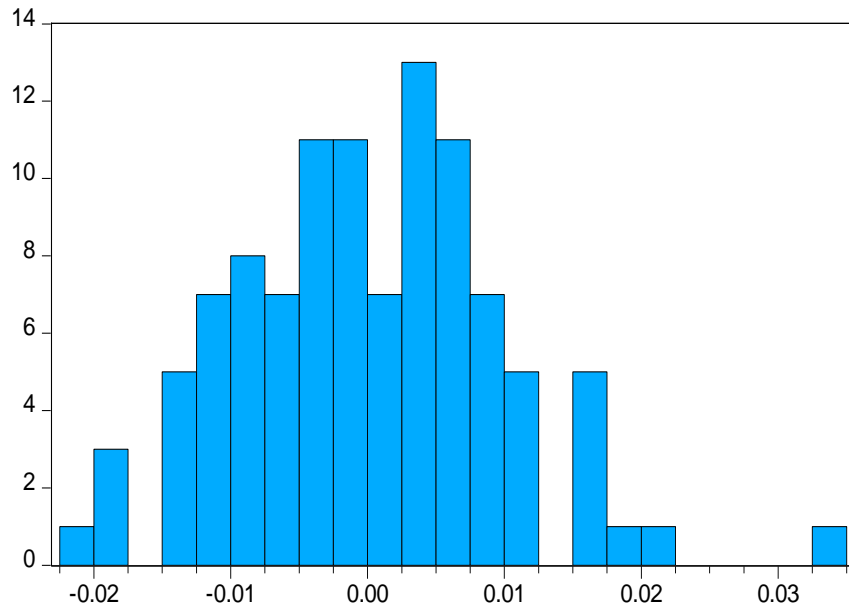
Sample: 1 104

Included observations: 104

| <i>Variable</i> | <i>Coefficient</i> | <i>Std. Error</i> | <i>t-Statistic</i> | <i>Prob.</i> |
|-----------------|--------------------|-------------------|--------------------|--------------|
| <i>C</i> | 0.000238 | 0.000133 | 1.786259 | 0.0772 |
| <i>OPE^2</i> | -0.031522 | 0.022906 | -1.376144 | 0.1720 |
| <i>DR^2</i> | 0.023065 | 0.030457 | 0.757283 | 0.4507 |
| <i>NII^2</i> | -5.45E-05 | 0.000206 | -0.264617 | 0.7919 |
| <i>LIQ^2</i> | -0.000199 | 0.000302 | -0.660066 | 0.5108 |
| <i>SIZE^2</i> | -6.09E-06 | 4.50E-06 | -1.354146 | 0.1789 |
| <i>GDP^2</i> | -0.000199 | 0.000418 | -0.476182 | 0.6350 |
| <i>INF^2</i> | -0.000413 | 0.000476 | -0.867461 | 0.3879 |

| | | | |
|---------------------------|-----------|------------------------------|-----------|
| <i>R-squared</i> | 0.043719 | <i>Mean dependent var</i> | 9.08E-05 |
| <i>Adjusted R-squared</i> | -0.026010 | <i>S.D. dependent var</i> | 0.000145 |
| <i>S.E. of regression</i> | 0.000147 | <i>Akaike info criterion</i> | -14.74083 |
| <i>Sum squared resid</i> | 2.07E-06 | <i>Schwarz criterion</i> | -14.53741 |
| <i>Log likelihood</i> | 774.5230 | <i>Hannan-Quinn criter.</i> | -14.65842 |
| <i>F-statistic</i> | 0.626980 | <i>Durbin-Watson stat</i> | 2.209451 |
| <i>Prob(F-statistic)</i> | 0.732486 | | |

Appendix IV: Normality Test



| | |
|--------------------------------|-----------|
| Series: Standardized Residuals | |
| Sample 2010 2017 | |
| Observations 104 | |
| Mean | -2.44e-18 |
| Median | -0.000782 |
| Maximum | 0.033349 |
| Minimum | -0.020475 |
| Std. Dev. | 0.009575 |
| Skewness | 0.327399 |
| Kurtosis | 3.408890 |
| Jarque-Bera | 2.582456 |
| Probability | 0.274933 |

Appendix V: Breusch-Godfrey Serial Correlation LM Test:

Breusch-Godfrey Serial Correlation LM Test:

| | | | |
|----------------------|----------|----------------------------|--------|
| <i>F-statistic</i> | 1.504774 | <i>Prob. F(2,94)</i> | 0.2274 |
| <i>Obs*R-squared</i> | 3.226414 | <i>Prob. Chi-Square(2)</i> | 0.1992 |

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 01/10/19 Time: 11:11

Sample: 1 104

Included observations: 104

Presample missing value lagged residuals set to zero.

| <i>Variable</i> | <i>Coefficient</i> | <i>Std. Error</i> | <i>t-Statistic</i> | <i>Prob.</i> |
|------------------|--------------------|-------------------|--------------------|--------------|
| <i>C</i> | -0.000545 | 0.020137 | -0.027069 | 0.9785 |
| <i>OPE</i> | -0.002146 | 0.127517 | -0.016829 | 0.9866 |
| <i>DR</i> | 0.047017 | 0.174464 | 0.269496 | 0.7881 |
| <i>NII</i> | -0.001452 | 0.012402 | -0.117071 | 0.9071 |
| <i>LIQ</i> | 0.000102 | 0.016803 | 0.006065 | 0.9952 |
| <i>SIZE</i> | -3.35E-05 | 0.002901 | -0.011533 | 0.9908 |
| <i>GDP</i> | -0.006266 | 0.011817 | -0.530267 | 0.5972 |
| <i>INF</i> | 0.001707 | 0.014321 | 0.119209 | 0.9054 |
| <i>RESID(-1)</i> | 0.177956 | 0.109342 | 1.627524 | 0.1070 |
| <i>RESID(-2)</i> | -0.092475 | 0.109303 | -0.846044 | 0.3997 |

| | | | |
|---------------------------|-----------|------------------------------|-----------|
| <i>R-squared</i> | 0.031023 | <i>Mean dependent var</i> | 2.75E-17 |
| <i>Adjusted R-squared</i> | -0.061751 | <i>S.D. dependent var</i> | 0.009573 |
| <i>S.E. of regression</i> | 0.009864 | <i>Akaike info criterion</i> | -6.308696 |
| <i>Sum squared resid</i> | 0.009146 | <i>Schwarz criterion</i> | -6.054428 |
| <i>Log likelihood</i> | 338.0522 | <i>Hannan-Quinn criter.</i> | -6.205685 |
| <i>F-statistic</i> | 0.334394 | <i>Durbin-Watson stat</i> | 1.969956 |
| <i>Prob(F-statistic)</i> | 0.961399 | | |

Appendix VI: Hausman Test

Correlated Random Effects - Hausman Test

Test cross-section random effects

| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
|----------------------|-------------------|--------------|--------|
| Cross-section random | 0.000000 | 7 | 1.0000 |

* Cross-section test variance is invalid. Hausman statistic set to zero.

Cross-section random effects test comparisons:

| Variable | Fixed | Random | Var(Diff.) | Prob. |
|----------|-----------|-----------|------------|--------|
| OPE | 0.271269 | 0.356328 | 0.012431 | 0.4455 |
| DR | 0.897206 | 0.689849 | 0.044745 | 0.3270 |
| NII | -0.053631 | -0.067004 | 0.000176 | 0.3140 |
| LIQ | 0.044706 | 0.045442 | 0.000033 | 0.8981 |
| SIZE | 0.012576 | 0.010119 | 0.000024 | 0.6176 |
| GDP | 0.040307 | 0.042309 | 0.000010 | 0.5252 |
| INF | -0.033672 | -0.030666 | 0.000013 | 0.3976 |

Cross-section random effects test equation:

Dependent Variable: LR

Method: Panel Least Squares

Date: 01/09/19 Time: 16:57

Sample: 2010 2017

Periods included: 8

Cross-sections included: 13

Total panel (balanced) observations: 104

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|--------|
| C | 0.034152 | 0.031125 | 1.097247 | 0.2757 |
| OPE | 0.271269 | 0.174300 | 1.556331 | 0.1234 |
| DR | 0.897206 | 0.284377 | 3.154988 | 0.0022 |
| NII | -0.053631 | 0.018820 | -2.849620 | 0.0055 |
| LIQ | 0.044706 | 0.018031 | 2.479461 | 0.0152 |
| SIZE | 0.012576 | 0.005850 | 2.149615 | 0.0345 |
| GDP | 0.040307 | 0.011807 | 3.413880 | 0.0010 |
| INF | -0.033672 | 0.014716 | -2.288165 | 0.0246 |

Effects Specification

Cross-section fixed (dummy variables)

| | | | |
|--------------------|----------|-----------------------|-----------|
| R-squared | 0.664270 | Mean dependent var | 0.121118 |
| Adjusted R-squared | 0.588332 | S.D. dependent var | 0.015433 |
| S.E. of regression | 0.009902 | Akaike info criterion | -6.221144 |
| Sum squared resid | 0.008236 | Schwarz criterion | -5.712607 |
| Log likelihood | 343.4995 | Hannan-Quinn criter. | -6.015120 |
| F-statistic | 8.747438 | Durbin-Watson stat | 2.037799 |
| Prob(F-statistic) | 0.000000 | | |

Appendix VII: Ramsey RESET Test

Ramsey RESET Test

Equation: EQ01

Specification: LR C OPE DR NII LIQ SIZE GDP INF

Omitted Variables: Squares of fitted values

| | Value | df | Probability |
|------------------|----------|---------|-------------|
| t-statistic | 0.362315 | 95 | 0.7179 |
| F-statistic | 0.131272 | (1, 95) | 0.7179 |
| Likelihood ratio | 0.143609 | 1 | 0.7047 |

F-test summary:

| | Sum of Sq. | df | Mean Squares |
|------------------|------------|----|--------------|
| Test SSR | 1.30E-05 | 1 | 1.30E-05 |
| Restricted SSR | 0.009438 | 96 | 9.83E-05 |
| Unrestricted SSR | 0.009425 | 95 | 9.92E-05 |

LR test summary:

| | Value | df |
|-------------------|----------|----|
| Restricted LogL | 336.4134 | 96 |
| Unrestricted LogL | 336.4852 | 95 |

Unrestricted Test Equation:

Dependent Variable: LR

Method: Least Squares

Date: 01/10/19 Time: 11:24

Sample: 1 104

Included observations: 104

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|--------|
| C | 0.050108 | 0.024997 | 2.004564 | 0.0479 |
| OPE | 0.590276 | 0.629151 | 0.938209 | 0.3505 |
| DR | 1.058894 | 1.098386 | 0.964046 | 0.3375 |
| NII | -0.108495 | 0.110630 | -0.980702 | 0.3292 |
| LIQ | 0.073488 | 0.078799 | 0.932605 | 0.3534 |
| SIZE | 0.016034 | 0.016872 | 0.950345 | 0.3443 |
| GDP | 0.064688 | 0.062685 | 1.031960 | 0.3047 |
| INF | -0.045292 | 0.044621 | -1.015037 | 0.3127 |
| FITTED^2 | -2.344754 | 6.471591 | -0.362315 | 0.7179 |

| | | | |
|--------------------|----------|-----------------------|-----------|
| R-squared | 0.615788 | Mean dependent var | 0.121118 |
| Adjusted R-squared | 0.583433 | S.D. dependent var | 0.015433 |
| S.E. of regression | 0.009961 | Akaike info criterion | -6.297793 |
| Sum squared resid | 0.009425 | Schwarz criterion | -6.068952 |
| Log likelihood | 336.4852 | Hannan-Quinn criter. | -6.205083 |
| F-statistic | 19.03240 | Durbin-Watson stat | 1.706608 |
| Prob(F-statistic) | 0.000000 | | |

Appendix VIII: List of Commercial Banks in Ethiopia

| <i>S. No.</i> | <i>Name of Bank</i> | <i>Year of Establishment</i> |
|---------------|---------------------------------------|------------------------------|
| 1 | <i>Commercial Bank of Ethiopia</i> | 1963 |
| 2 | <i>Awash Bank S.C</i> | 1994 |
| 3 | <i>Dashen Bank S.C</i> | 1995 |
| 4 | <i>Bank of Abyssinia S.C</i> | 1996 |
| 5 | <i>Wegagen Bank S.C</i> | 1997 |
| 6 | <i>United Bank S.C</i> | 1998 |
| 7 | <i>NIB International Bank S.C</i> | 1999 |
| 8 | <i>Cooperative bank of Oromia S.C</i> | 2004 |
| 9 | <i>Lion International Bank S.C</i> | 2006 |
| 10 | <i>Oromia International Bank S.C</i> | 2008 |
| 11 | <i>Zemen Bank S.C</i> | 2008 |
| 12 | <i>Bunna International Bank S.C</i> | 2009 |
| 13 | <i>Berhan International Bank S.C</i> | 2009 |
| 14 | <i>Abay Bank S.C</i> | 2010 |
| 15 | <i>Addis International Bank S.C</i> | 2011 |
| 16 | <i>Debab Global Bank S.C</i> | 2012 |
| 17 | <i>Enat Bank S.C</i> | 2013 |