



College of Business and Economics
Masters of Business Administration (MBA)

**Determinants of Commercial Bank's Lending Performance: The
Case of Private Commercial Banks in Ethiopia**

**Thesis Submitted In Partial Fulfillment of the Requirements for the Degree of
Master of Business Administration**

By

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DECLARATION

I, Aderajew Abera Abate, hereby declare that this research work entitled; “*Determinants of Commercial Banks’ Lending performance: The Case of Private Commercial Banks in Ethiopia*” submitted by me for the award of the degree of Master of Business Administration (MBA) , is my original work and that all sources of materials used for the study have been duly acknowledged. I have carried out independently with the advice and comments of my advisor of the research, Ato Gebremedin Gebrehiwot.

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Abstract

The main aim of this study was to identify and examining the macroeconomic and bank-specific factors that determine private commercial banks' lending performance in Ethiopia. In order to achieve this objective, data was collected from eight private commercial banks in Ethiopia operating over the period from 2007 to 2016. Four bank-specific (bank size, customer deposit, nonperforming loan and advance and liquidity) and three macroeconomic (cash reserve requirement, interest rate and gross domestic product) variables were analyzed by using the random effect regression model. The study revealed that bank size, cash reserve requirement and interest rate had positive and significant impact; while nonperforming loan and advance and interest rate had negative and significant impact on private commercial banks' lending performance in Ethiopia. However, customer deposit and gross domestic product had no statistically significant impact on private commercial banks' lending performance in Ethiopia. The study suggests that the private commercial banks operating in Ethiopia should work towards minimizing their nonperforming loans and advances to improve their lending performance; should give due attention on pricing of their loan and advance and consider the macroeconomic environment while developing their strategies.

Key words: Private Commercial Banks, Lending, Loan and Advance

Table of Contents

Acknowledgement	i
Abstract	ii
CHAPTER ONE: INTRODUCTION.....	1
1.1. Background of the study	1
1.2. Statement of the Problem.....	2
1.3. Objective Of the Study.....	4
1.4. Research Questions	4
1.5. Hypothesis of the Study	5
1.6. Significance of the Study	6
1.7. Scope of the Study	6
1.8. Organization of the Study	6
CHAPTER TWO: LITERATURES REVIEW.....	7
2.1. Introduction.....	7
2.2. Loans and Advances	7
2.3. Types of Loans and Advances	8
2.4. Principles of Lending	9
2.5. Theoretical Framework.....	11
2.5.1. Loan Pricing Theory	11
2.5.2. Theory of Multiple-Lending	11
2.5.3. Hold-up and Soft-Budget-Constraint Theories.....	12
2.5.4. Credit Market Theory	12
2.5.5. Theory of Soft Information vs. Hard Information	12
2.5.6. The Signaling Arguments	13
2.6. Determinants of Private Commercial Banks' Lending Performance	13
2.7. Empirical Studies Review.....	17
2.8. Knowledge Gap And Conclusion	23
2.9. Conceptual Framework of the Study	25
CHAPTER THREE: RESEARCH METHODOLOGY	26
3.1. Research Design.....	26
3.2. Research Approach	27

3.3. Study Population & Sampling.....	27
3.3.1. Study Population.....	27
3.3.2. Sampling Frame.....	28
3.3.3. Sample Size	28
3.4. Nature of Data and Data Collection Instrument.....	28
3.5. Data Analysis and Presentation.....	29
3.6. Study Variables Description.....	29
3.6.1. Dependent Variable	29
3.6.2. Independent Variables	30
3.7. Model Specification	33
CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS	36
4.1. Descriptive Statistics.....	36
4.2. Correlation Analysis	38
4.3. Testing Assumptions of Classical Linear Regression Model (CLRM)	39
4.3.1. Test for Mean Value of the Error Term Is Zero, ($E(U_t) = 0$) Assumption.....	40
4.3.2. Test of Heteroscedasticity, ($(\text{Var}(u_t) (\sigma^2 < \infty))$).....	40
4.3.3. Test for absence of autocorrelation assumption ($\text{cov}(u_i, u_j) = 0$ for $i \neq j$).....	41
4.3.4. Test for Multicollinearity.....	42
4.3.5. Test of Normality ($u_t \sim N(0, \sigma^2)$).....	43
4.4. Fixed effect model (FEM) vs. Random effect model (REM).....	44
4.5. Panel unit root test	45
4.6. Results of Regression Analysis.....	46
4.7. Discussion of the Regression Results	48
4.7.1. Bank Size (BS) and Loans and Advances (LOA)	49
4.7.2. Deposit Ratio (Dep) and Loans and Advances (LOA).....	49
4.7.3. NPLA and Loans and Advances.....	50
4.7.4. Liquidity and Loans and Advances	51
4.7.5. Cash Reserve Requirement (CRR).....	51
4.7.6. Interest Rate (IR) and Loans and Advances	52
4.7.7. Gross Domestic Product Growth (GDP) and Loans and Advances	53
4.8. Summary of Findings.....	54

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS	55
5.1. Conclusions	55
5.2. Recommendations	57
BIBLIOGRAPHY	59
APPENDICES	63

List of Tables:

Table 3.1: Summary of variables used in the study and their expected
Sign/impact ----- 35

Table 4.1: Descriptive statistics of dependent and independent variables ----- 36

Table 4.2: Correlation between the dependent and independent variables ----- 39

Table 4.3.1: White’s test of heteroscedasticity ----- 40

Table 4.3.2: correlation Matrix of Explanatory Variables ----- 43

Table 4.4: Hausman test ----- 45

Table 4.5: Panel unit root test----- 46

Table 4.6: Model regression result ----- 47

List of Figures:

Figure 4.3.1: DW Test of autocorrelation ----- 41

Figure 4.3.2: Normality test for residuals ----- 44

Acronyms:

 AIB	Awash International Bank
 AIDB	Agricultural and Industrial Development Bank
 BOA	Bank of Abyssinia
 BS	Bank Size
 CBE	Commercial Bank of Ethiopia
 CBO	Cooperative Bank of Oromia
 CLRM	Classical Linear Regrassion Model
 CRR	Cash Reserve Requirement
 DB	Dashen Bank
 Dep	Deposit
 GDP	Gross Domestic Product
 IR	Interest Rate
 LIB	Lion International Bank
 LIQ	Liquidity
 LOA	Loan and Advance
 MOFED	Ministry of Finance and Economic Development
 NBE	National Bank of Ethiopia
 NIB	Nib International Bank
 NPL	Nonperforming Loan
 NPLA	Nonperforming loan and Advance
 SME	Small and Medium Enterprise
 UB	United Bank
 WB	Wogagen Bank

CHAPTER ONE: INTRODUCTION

1.1. Background of the study

Commercial banks are the most important saving mobilization and financial resource allocation institutions. Consequently, these roles make them an important phenomenon in economic growth and development. In performing this role, it must be realized that banks have the potential, scope and prospects for mobilizing financial resources and allocating them to productive investments. Therefore, no matter the sources of the generation of income or the economic policies of the country, commercial banks would be interested in giving out loans and advances to their numerous customers bearing in mind, the three principles guiding their operations are profitability, liquidity and solvency (Olokoyo, 2011). In bank-dominated economies, the role of commercial banks is significant in providing the much-needed funds to the business public, as being the major and probably only source of funds for them in the absence of a well-developed capital market (Kannan and Dr. Sadalaimuthu, 2016).

The banking industry is critical component of the financial system in developing countries through facilitating capital accumulation and economic processes. This is possible through efficient financial intermediation by mobilize funds from the surplus spending units in order to bring financial costs down (Ladime, Sarpong-Kumankoma, and Kofi Osei, 2013). The main source of commercial banks' lending is deposit or money accepted from the depositor. Although bank's loan portfolio is the main means of income for the bank, commercial banks do not invest their entire resources in profitable asset rather they keep a portion of its resources idle to meet cash reserve requirement for the purpose of maintaining liquidity (Bhattarai, 2016).

Lending is the main function of commercial banks evidenced by the volume of loans that constitute bank's assets and the annual considerable raise of loan which is granted to borrowers both to private and public sector of economy (Malede, 2014). Bank loan is typically the largest asset and the predominant source of income for banks. Bank accept customer deposits and use that funds to grant loans to borrowers or invest in other assets that will yield a return higher than the amount of bank pays the depositor (Mac Carthy, 2010). The lending behavior of commercial

banks is largely influenced by the business model chosen by bank owners. Privately owned commercial banks typically follow business models that aim at profit maximization. On the other hand State-owned banks tend to follow social welfare-oriented models and deviate from the strict profit maximization model (Behr, Norden and Noth, 2012).

In Ethiopia, modern banking started in 1905 with the establishment of Abyssinian Bank based on a 50 years agreement with the Anglo-Egyptian National Bank. In 1931 the Ethiopian government purchased the Abyssinian Bank, which was the dominant bank, and renamed it as “Bank of Ethiopia”, the first nationally owned bank in Africa (Belay, 1990). In 1943 the Ethiopian government has established its own bank called State Bank of Ethiopia, which was performing both the commercial bank and central bank activities. Later on it was further dissolved into today’s National Bank of Ethiopia and Commercial Bank of Ethiopia (Abreha Gezae, 2015).

Before the Derg regime (1974 to 1991), there were private and state owned banks operating in the country such as CBE, AIDB (DBE), and CBB. By then, all financial institutions including banks were nationalized. After 1992, the financial sector has been deregulated and that gives birth to private banks, insurance companies and micro finance institutions (Abreha Gezae, 2015).

Recently, the number of commercial banks operating in the Ethiopia reached sixteen private commercial banks and one state owned commercial bank after the merger of CBE and CBB. The number of total commercial banks’ branch in the country reached 3,187 in 2015/2016 fiscal year (NBE, 2016).

The aim of this study is to identify and examine the macroeconomic and bank-level determinants of private commercial banks’ lending performance in Ethiopia.

1.2. Statement of the Problem

Commercial banks are important financial intermediaries serving the general public in any society. In most cases, commercial banks hold more assets than any financial institutions. Apart from their many functions, commercial banks facilitate growth and development of the country.

Viewed from the real sector, they contribute to investments, employment creation and extension and the process of economic growth (Kelvin, 2001).

Lending is the principal business for most commercial banks. Consequently, loan portfolio is the largest asset and source of revenue for commercial banks (Comptroller, 1998). In view of the significant contribution of loans to the financial health of banks through interest income earnings, these assets are considered the most valuable assets of banks. Bank loan is typically the largest asset and the predominant source of income for banks (Mitiku Malede, 2014). On the other side, it is one of the major sources of banks risk like default and liquidity risk. It is obvious that the more banks offer loans, the more it does generate revenue and more profit (Abreu & Mendes, 2002). But, banks have to be cautious in offering more loans because as they offer more loans to customers they expose themselves to liquidity and default risks which negatively affect banks' profits and survival (Rasiah, 2010). Therefore, it is very important for banks to clearly know the determining factors of good lending so as to reduce risks while increasing their return.

Commercial banks' lending performance is affected by external and internal factors. External factors are macroeconomic variable like GDP of the country, interest rate; cash reserve requirement, and others which are out of the control of the bank. On the other hand bank specific factors which are internal to the bank include bank size, volume of deposit, non-performing loans and advances, and liquidity level etc. Even though there are numerous studies performed in the area, their findings were not consistent on the determinants of private commercial bank' lending performance. Therefore, this study initiated to find out evidence on the determinants of private commercial banks' lending performance in Ethiopia and the effect of those determinants on their lending performance. In addition, the study aim to contribute to the current literatures by providing some evidence on the determinants of private commercial banks' lending performance.

1.3. Objective Of the Study

General Objective:

The main objective of this study is to identify and examine the macroeconomic and bank-specific factors that determine private commercial banks' lending performance in Ethiopia.

Specific Objectives:

More specifically this study aim

- ❖ To examine the effect of *Bank Size* on private commercial banks' lending performance in Ethiopia;
- ❖ To examine the effect of *Deposit* on private commercial banks' lending performance in Ethiopia;
- ❖ To examine the effect of *Non-performing loan and Advance* on private commercial banks' lending performance in Ethiopia;
- ❖ To examine the effect of *Liquidity* on private commercial banks' lending performance in Ethiopia;
- ❖ To examine the effect of *Gross Domestic Product (GDP)* on private commercial banks' lending performance in Ethiopia;
- ❖ To examine the effect of *Cash Reserve Requirement* on private commercial banks' lending performance in Ethiopia;
- ❖ To examine the effect of *Interest Rate* on private commercial banks' lending performance in Ethiopia;

1.4. Research Questions

In order to achieve the objectives of the study, the following research questions are formulated.

- ❖ What is the effect of bank-specific factors (*Bank Size; Volume of Deposit; non-performing loans and advances; and Liquidity*) on private commercial banks' lending performance in Ethiopia?

- ❖ What is the effect of macroeconomic factors (*Real Gross Domestic Product (GDP)*; *Cash Reserve Requirement*; and *Interest Rate*) on private commercial banks' lending performance in Ethiopia?

1.5. Hypothesis of the Study

Hypothesis is developed from prior empirical studies and theoretical framework or comes from prior literatures and studies on the topic. The hypotheses of this study stands on the prior empirical studies and theories related to determinants of commercial banks' lending performance that has been developed over the years. Prior studies and theories proposed the following research hypothesis.

H1: Bank size has positive and significant impact on private commercial banks' lending performance.

H2: Volume of deposit has positive and significant impact private commercial banks' lending performance.

H3: Non-performing loan and advance has negative and significant impact on private commercial banks' lending performance.

H4: Liquidity has negative and significant impact on private commercial banks' lending performance.

H5: Gross Domestic Product growth rate has positive and significant impact on private commercial banks' lending performance.

H6: Cash reserve requirement has negative and significant impact on private commercial banks' lending performance.

H7: Lending interest rate has negative and significant impact on private commercial banks' lending performance.

1.6. Significance of the Study

The finding of this study will examine the impact of macroeconomic and bank-specific factors on lending performance of private commercial banks in Ethiopia. Since lending is the principal business, largest asset and source of revenue for most commercial banks, understanding the factors that affect lending performance mainly important for commercial banks and NBE as a policy maker. In addition, it will have significant contribution for regulatory bodies, the academicians and the society as a whole.

The study will have great contribution for the existing knowledge in the area of determinants of private commercial banks' lending performance in Ethiopia. This study will be used as a base for further studies in the area.

1.7. Scope of the Study

The scope of the study is limited to examine the impact of bank size, deposit, nonperforming loan and advance, liquidity, cash reserve requirement, lending interest rate and GDP growth rate on private commercial banks' lending performance in Ethiopia. Private commercial banks operating in Ethiopia for at least ten years (2007 to 2016) is included in the study.

1.8. Organization of the Study

This research report is organized in five chapters. Chapter one provides the general overview about the whole study. Chapter two describes the review of related literatures. Chapter three provide detail description of the methodology employed by the study. Chapter four contains data presentation, analysis and interpretation. Finally, the last chapter concludes the total work of the study and gives conclusion and relevant recommendations based on the findings.

CHAPTER TWO: LITERATURES REVIEW

2.1. Introduction

Commercial banks are financial institutions which provide financial services such as accepting deposit from the general public and lending this fund to borrowers. By doing so, commercial banks make a meaningful contribution to the economic growth of every country. Commercial banks contribution to the growth lies in the role they play in mobilizing deposits and allocating the resources efficiently to the most productive uses and investment in the real sector. So making credit available to borrowers is one means by which banks contribute to the growth of economies (Wondimagegnehu Negera, 2012).

Lending is the provision of resources (granting loan) by one party to another. The second party doesn't reimburse the first party immediately there by generating a debt, and instead arranges either to repay or return those resources at a later date. Banks function as financial intermediaries, collecting funds from savers in the form of deposit and then supplying to borrowers as loans. Those functions benefit both the banks and the borrowers (Amano Getahun, 2014).

The principal function of most commercial banks is provision of loans and advances. The main sources of fund for providing the loans and advances are deposits, paid up capital, reserve funds and accumulated profit (Berhanu Abebie, 2016). By using these funds, commercial banks lend to borrowers at higher interest rate than they pay to depositors. The difference between these two interest rates becomes the main source of revenue for the commercial banks.

2.2. Loans and Advances

Loan can be defined as giving of money, property or other material goods to another party in exchange for future repayment of the principal amount along with its interest or other finance charges. A loan may be for specific, one-time amount or can be available as open-ended credit up to specified ceiling amount. Advance on the other hand, is a 'credit facility' granted by the

bank. Banks grant advances largely for short-term purposes, such as purchase of goods traded in and meeting other short-term trading liabilities. There is a sense of debt in loan, whereas an advance is a facility being availed of by the borrower. However, like loans, advances are also to be repaid. Thus a credit facility- repayable installment over a period is termed as loan while a credit facility repayable within one year may be known as advances (Ayush Garg, 2014).

2.3. Types of Loans and Advances

Commercial banks provide different types of loan and advances to borrowers. Some of loan types are the following.

DEMAND LOAN: it is a loan which is repayable on demand by the bank. In other word it is repayable at short notice. The entire amount of demand loan is disbursed at one time and the borrower has to pay interest on it. The borrower can repay the loan either in lump sum (one time) or as agreed with the bank. Demand loans are raised normally for working capital purpose (*National institute of open schooling, India*).

TERM LOAN: It is a loan provided for business purposes that needs to be paid back within a specified time frame (Ayush Garg, 2014).

SECURED AND UNSECURED LOAN: Secured loan is a loan in which the borrower pledges some asset as collateral for the loan, which then becomes a secured debt owed to the creditor who gives the loan. In the event that the borrower defaults, the creditor takes possession of the asset used as collateral. On the other side, unsecured loan is a loan which is not connected to any specific piece of property and instead the creditor may only satisfy the debt against the borrower rather than the borrower's collateral and the borrower (Ayush Garg, 2014).

OPEN-ENDED AND CLOSED-ENDED LOANS: open-ended loans are loans with a fixed-limit line of credit that can be borrowed from again after they have been repaid. Credit cards are one type of open-ended loan. On the other side, close-ended loans are loans that can't be borrowed from again, like mortgage loans. In close-ended loan, the borrower should apply for a new loan if additional loan is needed (Ayush Garg, 2014).

PERSONAL LOAN: an amount given to an individual to use for personal benefit that must be paid off at a specified time (Ayush Garg, 2014).

OVERDRAFT: overdraft facility is the result of an agreement with the bank by which a current account holder is allowed to draw over and above the credit balance in the account. The customer is permitted to withdraw the amount of overdraft allowed as and when he/she needs it and to repay it through deposits in the account (download.nos.org, business studies).

COMMERCIAL LOAN: it is funding arrangement between a business and a financial institution, typically used to fund major capital expenditures and or cover operational costs that the company may otherwise be unable to afford (Ayush Garg, 2014).

2.4. Principles of Lending

Bank performs different functions. Lending of money to different kinds of borrowers is one of the most important functions of commercial bank. A major portion of its fund is used for this purpose and this is also the major sources of bank's income. However, lending is not without risk. The borrowers of a bank range from individuals to partnership, companies, institutions, societies etc. The nature of their activities, the location of business, financial stability, earning and repaying capacity, purpose of advance, securities all differ and their degree of risks also differ. Therefore, a banker must take proper precaution in this process. As per Janata Bank Staff Collage (JBSC), Dhaka explanation, some of the important considerations to be kept in mind by a banker in this respect are discussed below:

SAFETY: It means that the borrower should be able to repay the loan and interest in time at regular intervals without default. Banks are trustee of public money. Bank's deposits are always payable on demand. Therefore, the bank has to maintain trust of depositor forever. As such the first and foremost principle of lending is to ensure safety of funds lent.

LIQUIDITY: The term liquidity refers to the extent of availability of funds with the banker for providing credit to borrowers. It is to be seen that money lent is not going to be locked up for a long time. The money should return to the bank as per the repayment schedule. This schedule

that is drawn up by the banker has to adhere to the requirement that at any point of time the banker should possess liquidity to meet the withdrawals of the depositors. It is to be kept in mind that various deposits have various maturities and some of it would also be payable on demand. A bank's inability to meet the demand of its depositors can lead to a run on the bank which is a threat to its basic survival. Hence the banker has to always monitor the cash flows and carry out the exercise of ensuring liquidity with the borrower as this in turn means liquidity with the banker.

PURPOSE OF THE LOAN: The purpose should be productive so that the money not only remain safe but also provides a definite source of repayment. Loans may be required for production purposes, trading purposes, agriculture, transport, self-employment etc. If a loan is required for a non-productive or speculative purpose, the banker should be very much cautious in entertaining such proposals. It is very difficult to ensure that the loan has been utilized for the purpose for which it was sanctioned. Banker should take follow-up measures to ensure end use of fund exactly for the same purpose for which it is borrowed.

PROFITABILITY: The ultimate objective of lending particularly privately owned commercial banks is to earn profits. Banks receive interest on loans and advances lent, and they pay interest to their depositors. This difference between the receipts and payments will be the bank's gross profit. Banks further incur various expenses as any organization does. After accounting for all such expenses and provisions, banks have to earn reasonable amount as net profit so that dividends can be paid to its shareholders.

SECURITY: The security offered by a borrower for advances is as like as the insurance to the banker. It serves as the safety valve for an unforeseen emergency. So another principle of sound lending is the security of lending. Security offered against loan may be various. It may be building, flat, insurance policies; term deposits etc. The security and its adequacy alone should not form the sole consideration for judging the viability of a loan proposal. Nevertheless, the security if accepted must be adequate and readily marketable, easy to handle and free from encumbrance. It is the duty of the banker to check the nature of the security and assess whether it is adequate for the loan granted.

DIVERSIFICATION: A prudent banker always tries to select the borrower very carefully and takes tangible assets as security to safeguard his interests. While this is no doubt an adequate measure, there are other unforeseen contingencies against which the banker has to guard himself. Further if the bank lends large amounts to a single industry or borrower, then the default by that customer can affect the banking industry as a whole and will affect the basic survival of the industry. To safeguard his interest against all such risks, the banker follows the principle of diversification of risks based on the famous maxim 'never keep all the eggs in one basket'. By lending funds to different sectors, a bank can save itself from the slump in some sectors by way of prosperity in the others. Banks have to lend to a large number of industries and borrowers so that the risk gets diversified (Janata Bank Limited, www.jb.com)

2.5. Theoretical Framework

2.5.1. Loan Pricing Theory

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

2.5.2. Theory of Multiple-Lending

It is found in literature that banks should be less inclined to share lending (loan syndication) in the presence of well-developed equity markets and after a process consolidation. Both outside equity and mergers and acquisitions increase banks' lending capacities, thus reducing their need of greater diversification and monitoring through share lending (Carletti et al, 2006; Ongene & Smith, 2000; Karceski et al, 2004; Degryse et al, 2004).

2.5.3. Hold-up and Soft-Budget-Constraint Theories

Banks choice of multiple-bank lending is in terms of two inefficiencies affecting exclusive bank firm relationships, namely the hold-up and the soft-budget-constraint problems. According to the hold-up literature, sharing lending avoids the expropriation of informational rents and improves firms' incentives to make proper investment choices (Rajan, 1992; Hellwig, 1991 and 2000; and, in particular, von Thadden, 1992 and 2004). Second, multiple-bank lending helps with the soft budget-constraint problem in that it enables banks not to extend further inefficient credit, thus reducing firms' strategic defaults (Dewatripont and Maskin, 1995; Bolton and Scharfstein, 1996). Both of these theories consider multiple-bank lending as a way to improve entrepreneurs' incentives, and focus on firms' decisions to borrow from more than one bank. Both of these theories consider multiple-bank lending as a way to improve entrepreneurs' incentives, and focus on firms' decisions to borrow from more than one bank. Neither of them, however, addresses how multiple-bank lending affects banks' incentives to monitor, and thus cannot explain the apparent discrepancy between the empirical observation of multiple bank relationships and the importance of bank monitoring (Carletti, Cerasi & Daltung, 2007).

2.5.4. Credit Market Theory

This theory postulates that if collateral and other restrictions (covenants) remain constant, the interest rate is the only price mechanism. With an increasing demand for credit and a given customer supply, the interest rate rises, and vice versa. If risk is added to this model, the future interest payments and repayments are stochastic. In this case a surcharge on the alternative investment without risk is calculated (interest rate premium) relative to the underlying default probability. According to this theory, the corresponding failure risk should affect the pricing in this context, collateral has no effect on pricing. The interest rate refers only to the amount of credit without collateral. For this reason, a bad borrower who would like to have the same nominal interest rate like a good borrower is compelled to offer more collateral (Ewert, Schenk, Szczesny, 2000).

2.5.5. Theory of Soft Information vs. Hard Information

This theory is based on the competitive advantage of large and small banks to process information. Small size banks with simple organizational structures have comparative

advantages in producing soft information and thereby excel at providing relationship lending. The main source of soft information is obtained through personal commercial relationship along the time. On the other side, large banks have comparative advantage in lending based on hard information which is generated by standardized process and systems, standardized operational procedures, computational mechanisms and other formal procedures.

2.5.6. The Signaling Arguments

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

2.6. Determinants of Private Commercial Banks' Lending Performance

Banks are globally known as major actors in lubricating the economy through their intermediation role (Ujuju & Etale, 2016). Commercial banks efficiently channel funds from those who have surplus fund to those in need of it. This transformation process is affected by numerous factors which are bank-specific and macroeconomic. The bank specific factors are relatively under the control of the management of the bank whereas the macroeconomic factors are out of the control of the management. This study examines the effect of the following determinants of private commercial banks' lending performance in Ethiopia.

Bank Size

Bank size is considered as an important determinant of commercial banks' lending performance (Berger and Udell, 2006). Berger and Udell (2006) provide that large and complex banks tend to lend few loans to small scale firms. Stein (2000) explains that small banks have comparative advantages in producing soft information whereas large banks also have comparative advantages in lending based on hard information. On the other hand, when large and complex banks are able, through technical expertise, to process soft information about small scale firms, then there would be positive relationship between bank size and lending performance. Due to the fact that large banks have economies of scale advantage to provide loans and advance efficiently; their

capability to provide large amount of loans and advance when need by the borrowers; having better capability of providing different types of loans and advances menu to their customers; and their better capability to be more accessible to their borrowers, there will be positive relationship between bank size and loans and advance disbursement of commercial banks.

Deposit

Bank accept customer deposits and use that fund to grant loans to borrowers or invest in other assets that will yield a return higher than the amount bank pays the depositor (McCarthy et al., 2010). Most business organizations, especially in developing countries are highly dependent on bank loans as a source of capital and the ability of banks in giving loans depends much on their ability to attract deposits (Haron and Azmi, 2006). This is because an increasing trend in deposit mobilization implies more liquidity for the banks and more funds will be available for lending, thereby increasing the ability of the banks to make more profit (Berhanu Abebe, 2016). According to McCarthy et al. (2010) Customers' deposit is the primary source of bank loan. And thereby, deposits directly have a positive impact on lending performance.

Non-Performing Loan and Advance

Non-performing loan and advance is a loan and advance whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with the contractual repayment terms of the loans and advances is in question. As per NBE's directive no. SBB/52/2012, short term loans, loans with original repayment or maturity period of less than two years, are non-performing when the principal and/or interest is due and uncollectable for 90(ninety) consecutive days or more beyond the scheduled payment date or maturity. On the other side, Medium and long term loans are non-performing when the principal and/or interest is due and uncollectable for 12(twelve) consecutive months or more beyond the scheduled payment date or maturity. An increase in the non-performance loan and advances means a worsening of the credit quality and this could lead banks to decrease their lending activity (Doriana CUCINELLI, 2015). Therefore, inverse relationship is expected between lending performance and NPLA.

Liquidity

Liquidity is the ability to meet its financial obligations when they become due. Bank lending finances investments which are relatively illiquid assets, but it funds its loans with mostly short term liabilities. Thus one of the main challenges of commercial banks is ensuring its own liquidity under all reasonable conditions. When the bank unable to meet short term financial demand, the issue of liquidity will arise. Goldfeld and Chandler (1980) claimed that commercial banks must pay more attention to liquidity than many other types of financial institutions such as life insurance companies. This results from the high turnover of their debt liabilities. This is due to the fact that liquidity is one of the major determinants of lending performance of commercial banks. Since loan is illiquid asset but financed by using liquid asset, when the bank lending increased, it reduce liquid asset of the bank. On the other side, when the bank needs to increase its liquidity level, it will reduce its loans. Therefore, liquidity has negative effect on loans and advances of private commercial banks.

Gross Domestic Product (GDP)

GDP growth rate measures how fast country's economy is growing. It does it by comparing one period of the country's economy output to the last period. The GDP growth rate is driven by the four components of GDP. By far, the most important driver of GDP growth is personal consumption, which includes retail sales. GDP growth is also driven by business investment, which includes construction and inventory levels. Government spending is the third driver of growth. The last but not the least is exports and imports. Exports drive growth, but increase in import has negative impact. Mathematically, $GDP = \text{Personal consumption expenditure} + \text{business investment} + \text{government spending} + (\text{export} - \text{import})$ (Kimberly Amadeo, 2016).

The economic environment is a systematic risk component that affects every participant within the economy. The general performance of the economy is reflected by the macroeconomic aggregates including the gross domestic product (GDP), employment level, industrial capacity utilization. Banks therefore adjust their lending behavior in response to the signals from these factors, such that positive signals make banks become more favorably disposed to lending. Thus, banks' loan portfolio including volume, tenor and structure are generally influenced by their expectations of the performance of economy both in terms of stability and quantum/level of

performance. Banks make out more loans during periods of boom and reduced level of macroeconomic uncertainty and curtail lending when the economy is in recession (Lucky E & Dr. Lyndon M, 2016). Therefore, GDP has positive effect on the lending performance of private commercial banks.

Cash Reserve Requirement

The cash reserve requirement is a central bank regulation employed by most, but not all, of the world's central banks, that sets the minimum amount of reserves that must be held by commercial banks. The amount of required minimum reserve is generally determined by the central bank as being equal to not less than a specified percentage or fraction of deposit liabilities that the commercial banks owes to its customers. The commercial bank's reserve normally consist of cash owned by the bank and stored physically in the bank vault (vault cash), plus the amount of the commercial bank's balance in the bank's account with the central bank. The required reserve sometimes used as a tool in monetary policy, influencing the country's borrowing and interest rates by changing the amount of funds available for banks to make loans with (Wikipedia.org).

In Ethiopia, National Bank of Ethiopia is vested with powers, duties and responsibilities of monetary management and regulation and supervision of banks (Directive No. SBB/55/2013). Cash reserve requirement, which obliges banks to hold a proportion of their deposit balance is one of the important monetary policy instrument to maintain liquidity in the banking system of Ethiopia. Banks operating in Ethiopia shall open accounts with the National Bank of Ethiopia to be used as a reserve account. It exclusively be used to maintain the reserve balance requirement and no bank shall withdraw any money from its reserve account without prior approval of the Supervision Department of the National Bank of Ethiopia. As per Directive No. SBB/55/2013 of National Bank of Ethiopia, any bank operating in Ethiopia shall at all times maintain at least 5% of all Birr and foreign currency deposit liabilities held in the form of demand (current), saving and time deposits. When the National Bank increases this reserve requirement, it lowers the amount that can be provided as loan and advance to the borrowers. Therefore, cash reserve requirement has negative effect on loans and advances of the commercial banks.

Interest Rate

Commercial Banks are exposed to adverse movements in interest rates as rates on their long, fixed-term assets are on average locked-in for longer than rates on their liabilities. When the general level of interest rates rises, banks typically experience a loss in economic value as the value of assets decreases more than the value of liabilities. The theoretical literature on the transmission of monetary policy postulates that interest rate risk exposure indeed makes bank lending more sensitive to changes in nominal interest rates (Van den Heuvel, 2007). The postulated mechanism has the following intuition: If nominal interest rates rise, the resulting loss depletes a bank's economic capital and brings it closer to regulatory or market requirements. In such a situation, the bank's ability to restore its required capital level by issuing new equity is limited, because equity issuances are costly due to asymmetric information between existing and potential new shareholders (Myers and Majluf, 1984; Kashyap and Stein, 1995; Myers, 2001). Consequently, the bank reduces its lending in order to still comply with the capital requirements imposed by regulators or market participants (Beutlerz, Bichselz, Bruhin, and Danton, 2015).

In Ethiopia, NBE set the minimum saving and time deposit rates. But commercial banks may pay higher interest rate than the minimum rate set by NBE. The lending interest rate is fully liberalized, and hence there is no lower/ upper lending rate in the country. Therefore, each bank determines their lending interest rates (NBE, 2016). If the commercial banks increased their lending interest rate, the borrowers will not be motivated to borrow. Therefore, lending interest rate has negative impact on loans and advance disbursement of the banks.

2.7. Empirical Studies Review

There are several empirical studies that examine the internal and external determinants of commercial banks' lending performance studied in different countries. These studies are summarized as follow.

Moussa M. & Hedfi Chedia (2016) examined the determinants of banks' lending in Tunisia. They studied the internal and external factors of bank credits in Tunisia using a panel data of through a sample of 18 banks in the period 2000 to 2013. The dependent variable of the study

was Total Loans and Advances while Return on Asset, Return on Equity, Net Interest Margin, Size of the bank, Equity to Total Asset Ratio, Operating Expense to Total Asset Ratio, Financial Expense to Total Credit Ratio, Total Deposit to Total Asset Ratio, Total Liquid Asset to Total Asset Ratio, GDP growth, Rate of Inflation, Ownership structure of the bank whether it is Private Bank or not and whether it is Foreign Bank or not were independent variables. The result of the study shows among the explanatory variables, only return on asset net interest margin, liquidity and inflation had significant impact on total loan and advance. Return on asset and liquidity had negative while net interest margin and inflation had positive impact on loan and advance.

Similarly, Raj Bhattarai (2016) has investigated the determinants of commercial banks' lending behavior in the Nepalese context. The pooled data of 4 commercial banks for the period 2007 to 2014 had been analyzed using regression model. The dependent variable used in the study was loans and advances (LOA) and the independent variables used in the study were: Bank size, Liquidity, Investment Portfolio, Cash Reserve ratio and Deposit to Capital ratio. The regression results revealed that bank size has significant and positive effect on loans and advances whereas liquidity ratio, investment portfolio and cash reserve ratio have significant and negative effect on Nepalese commercial banks' loan and advance.

Ladime, Kumankoma and Osei (2013) also investigated the determinants of bank lending behavior in Ghana. The study uses panel data, which involves pooling of seventeen (17) banks over the period 1997 – 2006, and further adopts the model used by Alfaro *et al.* (2003). This model assumes that bank lending behavior today is explained by past lending experience (lag of the dependent variable), banking industry characteristics, macroeconomic and bank-specific variables. Therefore, independent variables in this study categorized into macroeconomic variables (Central Bank Lending Rate, Exchange rate Real GDP growth), bank industry characteristics (Competition in the industry) and bank-specific characteristics (Bank Size, Capital Structure and Spread (Net Interest Margin). And the dependent variable is loans and advances of commercial banks. The study used Generalized Method of Moments (GMM) estimators, which was propounded by Arellano and Bond (1991). The study finding shows that bank size and capital structure have a statistically significant and positive relationship with bank lending behavior. They also find evidence of negative and significant impact of some

macroeconomic indicators (central bank lending rate and exchange rate) on bank lending behavior. Again, competition in the industry was found to have a positive and significant impact on bank lending behavior. Finally they recommended policies aimed at maintaining stable macroeconomic fundamentals that would greatly accelerate bank lending.

Olokoyo F. (2011) investigated the determinants of commercial banks' lending behavior in the Nigeria. The study aimed to test and confirm the effectiveness of the common determinants of commercial banks' lending behavior and how it affects the lending behavior of commercial banks. All commercial banks (89 banks) in Nigeria for the period 1980 –2005 were used in the study. Olokoyo adopts econometric approach to test the degree of correlation between the variables by employing the multiple regression analysis of the Ordinary Least Square (OLS) method. Volume of Deposit, Investment Portfolio, Lending Interest Rate, Cash Reserve Requirement Ratio, Liquidity Ratio, Annual Average Official Exchange Rate of the Naira vis-a-vis the United States' Dollar, GDP were independent variables of the study to see its effect on Loans and Advance. The finding revealed that Volume of Deposit, Investment Portfolio, exchange rate and GDP had significant and positive impact on lending of commercial banks whereas liquidity, lending interest rate and cash reserve requirement had positive and insignificant effect. From the regression analysis, the model was found to be significant and its estimators turned out as expected and it was discovered that commercial banks deposits have the greatest impacts on their lending behavior. The study then suggested that commercial banks should focus on mobilizing more deposits as this will enhance their lending performance and should formulate critical, realistic and comprehensive strategic and financial plans.

Serpil Tomak studied the Bank Size, Total Liability, Non-performance Loan, Inflation, GDP, Ownership structure whether it is private and Interest Rate variables' impact on Bank Lending Behavior in Turkey using quarterly bank level data of 15 private commercial banks and 3 state-owned banks for the 2003-2012 periods. The empirical results indicate that banks' business loans performance significantly depends on its size, total liabilities, nonperforming loans to total loans (NPL) and inflation rate. Besides, ownership structure also affects the total business loans behavior. Except NPL and Interest rate, all determinants had positive impact on the lending of Turkey's commercial banks.

Lucky E. Ujuju and Dr. Lyndon M. Etale performed Macroeconomic analysis of the relationship between Interest rate, Economic growth (real GDP) and Bank Lending in Nigeria. 30 years' data (1985- 2014) was used and analyzed by employing Ordinary Least Squares (OLS) technique. The study found that interest rate had negative and significant effect on bank lending in Nigeria. This implies that prime lending rate significantly retards commercial bank lending to the economy. Real GDP has positive correlation but insignificantly affects banks' lending. This implies that a rise in economic growth (RGDP) will spur bank lending to the economy but its level is inadequate to meet up bank required deposit level for improved lending to the economy.

Akinyomi Oladele John (2014) examined the effect of deposit volume on bank lending behavior in the Nigerian Post-consolidation banking era. The result of the regression analysis revealed that the independent variable (Volume of Deposit) has a significant and positive relationship with the dependent variable (Loan and Advances) on the Nigerian deposits money banks. Therefore, John recommended bank management to devise new methods of enhancing customers' deposits.

Doriana Cucinelli (2015) studied the impact of non-performing loans on bank lending behavior in the Italian banking sector. In the study, the sample consists of 488 banks data covering 2007-2013 were observed. The finding reveals that Non-performing Loans has significant and negative impact on bank lending behavior.

Adedayo and Ayodeji (2015) examined the effect of Cash Reserve Requirement on Lending Behavior of Banks to small and medium scale Enterprises in Nigeria by randomly selecting a sample of 8 banks from 20 banks. The results of the analysis conducted revealed that there is no significant relationship between cash reserve requirement and volume of loans that banks lend to SMEs. Specifically, the results of the study revealed insignificant effect on banks' willingness to enhance loan portfolio to SMEs even with lowering of reserve requirements. In other words, reduction of reserve requirement of Nigerian banking sector did not show any proportional improvement in the lending disposition to small and medium scale enterprises.

In the study of Nazir, Naqvi and Nawaz, the effect of rate of return, inflation and deposits on loan supply of banks in Pakistan was investigated. The period of study is spread over eighteen

years starting from 1991 to 2009 for the banking sector of Pakistan. In order to comprehend the results, monthly data were used and they got 216 monthly observations for 23 commercial banks operating in Pakistan. The result of the study conclude that, keeping all other variables constant, the supply of loan of particular month is positively related with the inflation in that month and negatively related with the weighted average rate of return on advances. Moreover supply of loan of particular month is positively related with the deposits of last month.

Amono Getahun (2014) in his working paper empirically investigated the determinants of lending behavior of commercial banks in Ethiopia. In his study, balanced fixed effect panel regression model was used for the data of eight commercial banks in the sample covered the period from 2001 to 2013. The study covered all commercial banks working in the period of the study. Seven factors affecting banks' loans and advances were selected and analyzed. The result of the study revealed that volume of deposit, bank size, Cash reserve requirement, and inflation rate has positive and significant impact on loan and advance whereas liquidity ratio and interest rate has negative and significant impact on loans and advances. Even though GDP positively affected loans and advances, its impact is insignificant. At last, Amano generally recommended that commercial banks should focus on mobilizing more deposits as this will enhance their lending performance and should formulate critical, realistic and comprehensive strategic and financial plans.

Similarly Mitku Malede (2014) empirically analyzed the main determinants of commercial Banks' Lending in Ethiopia by using panel data of eight commercial banks working in the period from 2005 to 2011. Mitiku examined the relationship between commercial banks' lending and its some determinants specifically Bank Size, Credit Risk, Gross Domestic Product, Investment, Deposit, Interest Rate, Liquidity Ratio and Cash Required Reserve. Ordinary least square (OLS) was applied to determine the impact of those predictor variables on commercial bank lending. The result of the study suggested that 88.33% variation of commercial banks' lending is explained by the variables in the study at 1% level of significance. The finding of the study also revealed bank size, credit risk, GDP and liquidity has positive relationship and significantly affected commercial banks' lending. Even though cash reserve requirement and lending interest rate has positively affected commercial banks' lending, its effect is insignificant. As the

empirical finding indicated, investment portfolio has been found as positive statistically insignificant relationship with commercial bank lending. This implies that, when a bank engages in investing its resources in different financial instruments that bears interest for the bank, its ability of lending also increase but insignificantly. In contrary to many studies, the study found that deposit has statistically insignificant relationship with commercial bank lending.

Berhanu Abebe (2016), investigates the determinants of lending decision of private commercial banks in Ethiopia and its effect on their financial performance. Berhanu used random effect panel regression for the data of six private commercial banks in Ethiopia for the sample covered the period from 2001 to 2015. The study covered all private commercial banks that were working in the period of the study. Eight variables that affect banks' lending were selected and analyzed in the study. The regression result shows that liquidity ratio, capital adequacy ratio, inflation rate and gross domestic product has positive and statistically significant impact on the banks' lending whereas nonperforming loans, cash reserve requirement rate and lending interest rate had negative and statistically significant impact on the lending. On the other hand, volume of deposit had positive but insignificant impact on lending. The study suggests that Ethiopian commercial banks should/need to work more to improve their liquidity and capitalization, to reduce their nonperforming loans and consider macroeconomic environment when extend loans.

The studies which are reviewed had inconsistent result on the determinants of commercial banks' lending around the world and even in Ethiopia in between the three studies. In the findings of Olokoyo (2011), Oladele (2014) and Amano (2014), volume of deposit has positive and significant effect on commercial lending. In contrary, even volume of deposit affected lending positively; its effect was insignificant in the studies of Berhanu (2016), Aymen & Chedia (2016) and Mitiku (2014). Regarding liquidity, the studies of Aymen & Chedia (2016), Raj Bhattarai (2016) and Amano (2014) agreed with its negative and significant effect on lending whereas it has positive and significant effect as per the finding of Mitiku (2014) and Berhanu (2016). Olokoyo (2011)'s study on the other side indicated liquidity's insignificant effect on lending. The studies of Amano (2014), Ujuju & Etale and Berhanu (2016) revealed that lending interest rate has negative and significant effect on commercial banks' lending whereas its effect is insignificant in the findings of Olokoyo (2011), Tomak and Mitiku (2014). Economic growth

which is measured by GDP has positive and significant effect on commercial banks' lending as per the findings of Berhanu (2016), Olokoyo (2011), and Mitiku (2014) however its insignificance found in the studies of Aymen & Chedia (2016), Tomak, Ujuju & Etale and Amano(2014). Cash reserve requirement's effect on commercial banks' lending is negative and significant in the findings of Raj Bhattarai (2016) and Berhanu (2016) where as it has positive and significant effect in the study of Amano (2014). On the other side, it has insignificant effect in the studies of Olokoyo (2011), Mitiku (2014) and Adedayo & Ayodeji (2015).

Studies included the above review has similar finding on non-performing loans and advance's negative effect except Mitiku Malede's finding and bank size's positive effect on commercial banks' lending.

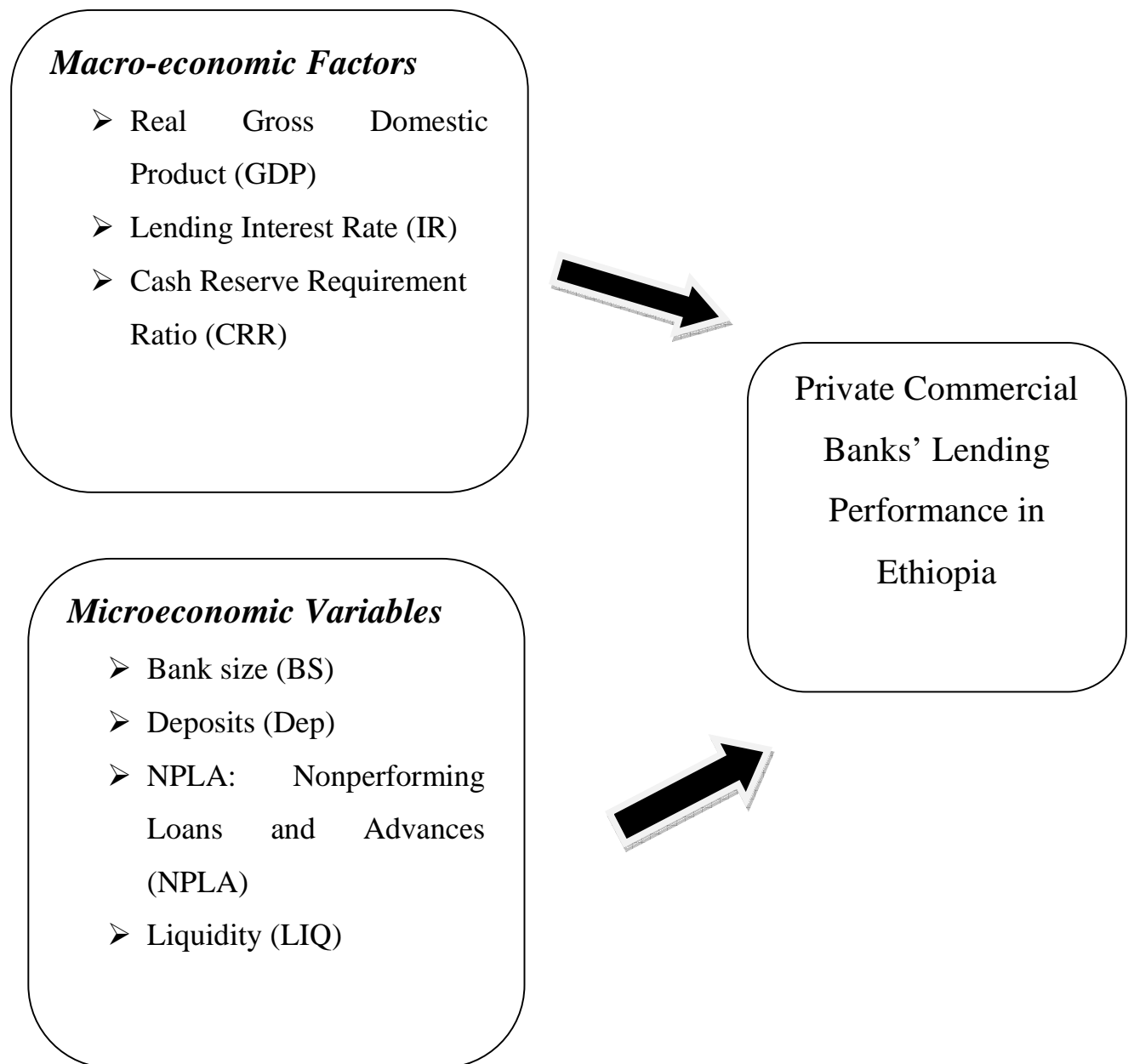
2.8. Knowledge Gap And Conclusion

Commercial Banks play significant role in economic growth of developing nations. In bank-dominated economies, the role of commercial banks are significant in providing the much-needed funds to the business public, as being the major and probably only source of funds for them in the absence of a well-developed capital market (A.S. Kannan and Dr. S. Sadalaimuthu, 2016). Lending is the principal business for most commercial banks. Consequently, loan portfolio is the largest asset and source of revenue for banks (Comptroller, 1998). In view of the significant contribution of loans to the financial health of banks through interest income earnings, these assets are considered the most valuable assets of banks. Commercial Banks function as financial intermediaries through collecting of funds from savers in the form of deposit and then supplying to borrowers as loans and advance. This intermediation function is affected by numerous factors which are macroeconomic as well as bank-specific. Macroeconomic factors are the result of monetary, economic and legal environment of the country whereas bank-specific factors are relatively under the control of the management. Therefore, understanding the determinants of commercial banks' lending is very critical for banks, policy makers and the general public as well.

In Ethiopia, to the knowledge of the researcher, there are only three empirical studies in relation to commercial banks' lending but of the three, only Birhanu focused on the private commercial

banks even though he studied by linking it with its effect on financial performance as reviewed above. The study of Amano and Mitiku examined determinants of lending by including both public and private banks whereas. Even though both privately and publicly owned commercial banks give commercial banking service, their motive has some difference. The aim of public banks is not only being profitable but also to support national development priorities. Therefore, the motive of public banks is beyond profitability and stock holders' wealth. In the other side, the aim of private commercial banks is profitability and to maximize their shareholders' wealth. Since the motive of public bank and private banks is different, it is better to study separately and this study focused on private commercial banks' lending. Therefore, studies' inconsistent results on the determinants of commercial banks' lending around the world and lack of sufficient research in the area particularly in Ethiopia initiated this study.

2.9. Conceptual Framework of the Study



Source: own

CHAPTER THREE: RESEARCH METHODOLOGY

The purpose of this chapter is to discuss the methods adopted throughout the study to accomplish the research objectives. The chapter is arranged as follows: Section 3.1 deals with research design and Section 3.2 presents research approach adopted by the study. This is followed by study population and sampling under section 3.3. Next, the nature of the data, instrument of data collection, is explained in section 3.4. Section 3.5 is data analysis and presentation. Finally, section 3.6 deals with study variables description.

3.1. Research Design

The research methodology begins by presenting the overall research design, as the research design provides an important framework & guidelines on how to collect and analyze data. 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 (Mekbib, 2016).

Depending on the specific purpose that the research tries to address, research can be classified as descriptive, explanatory and exploratory studies. *Descriptive research* sets out to describe and to interpret what is and it looks at individuals, groups, institutions, methods and materials in order to describe, compare, contrast, classify, analyze and interpret the entities and the events that constitute the various fields of inquiry. It aims to describe the state of affairs as it exists. On the other hand, *explanatory research*, aim at establishing the cause and effect relationship between variables. The researcher uses the facts or information already available to analyze and make a critical evaluation of the data/information. *Exploratory research* is less formal, sometimes even unstructured and focuses on gaining background information and helps to better understand and clarify a problem. It can be used to develop hypotheses and to develop questions to be answered (*Introduction to research methods, Addis Ababa University, 2009*). Based on the above discussion, to achieve the intended objective this study employed explanatory research design.

3.2. Research Approach

In an investigative study there are three familiar types of research approaches to business and social research namely, quantitative, qualitative and mixed methods approach. Though, each approach has its own strengths and limitations, Creswell (2003) advocates that certain types of social research problems call for specific approaches.

Qualitative research approach involves studies that do not attempt to quantify their results through statistical summary or analysis. It seeks to describe various aspects about behavior and other factors studied in the social sciences and humanities. In qualitative research data are often in the form of descriptions, not numbers. On the other hand, Quantitative research is the systematic and scientific investigation of quantitative properties and phenomena and their relationships. The objective of quantitative research is to develop and employ mathematical models, theories and hypotheses pertaining to natural phenomena. The process of measurement is central to quantitative research because it provides the fundamental connection between empirical observation and mathematical expression of an attribute (*Introduction to research methods, Addis Ababa University, 2009*). Considering the research problem and objective along with the philosophy of the different research approaches, the quantitative nature of the data collected, quantitative research approach was found to be appropriate for this study.

3.3. Study Population & Sampling

3.3.1. Study Population

The study population includes all private commercial banks which were operating in Ethiopia. According to NBE report, at the end of June 30, 2016 there are sixteen privately owned commercial banks. These includes Awash International Bank S.C (AIB), Dashen Bank S.C (DB), Bank of Abyssinia S.C (BOA), Wogagen Bank S.C (WB), United Bank S.C (UB), Nib International Bank S.C (NIB), Lion International Bank S.C (LIB), Zemen Bank(ZB), Cooperative Bank of Oromia S.C (CBO), Berehan International Bank S.C (BIB), Buna International Bank S.C (BUIB), Oromia International Bank S.C (OIB), Abay Bank S.C.(AB), Addis International Bank (AIB), Dehub Global Bank (DGB), and Enat Bank (EB).

3.3.2. Sampling Frame

The frame for drawing sample included those commercial banks having at least ten years working experience in Ethiopia (i.e. from 2006/7 to 2015/16). In Ethiopia there are eight private commercial banks working during the study period. These are Awash International Bank S.C (AIB), Dashen Bank S.C (DB), Bank of Abyssinia S.C (BOA), Wogagen Bank S.C (WB), United Bank S.C (UB), Nib International Bank S.C (NIB), Lion International Bank S.C (LIB), and Cooperative Bank of Oromia S.C (CBO). Therefore, the matrix for the frame is 10*8 that includes 80 observations.

3.3.3. Sample Size

Sample is the portion of the study population and used when addressing the total population in the study is not possible. According to Brooks (2008, p 105), 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 says that as the sample size approaches to the population, the results from the sample estimates are more appropriate for generalizing to the general population. But in this study, since the number of banks in the country is small, we include all private commercial banks operating from 2007 to 2016 in the study. Therefore, the sampling frame and the sample is the same in this study.

3.4. Nature of Data and Data Collection Instrument

Given the research design, secondary data was used to achieve the objectives the study. Panel data of eight private commercial banks for ten years (2006/7 to 2015/16) was used. This is because of that panel data has 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, that captures dynamic natures of the data (Gujarati, 2004).

Structured document analysis was used for this research to collect required information, which was relevant for addressing the objectives of the study. Data was collected from audited financial statements (balance sheet and income statement) of each commercial bank included in the sample and various journals and publications of NBE and MOFED for the macroeconomic data

from 2006/7 to 2015/16. All data was collected on annual base and the figures for the variables were on June 30 of each year under study.

3.5. Data Analysis and Presentation

To test the proposed hypotheses, the collected panel data were analyzed using descriptive statistics, correlations, and finally through fixed effect regression analysis. Descriptive statistics used to analyze the general trends of the data from 2006/7-2015/16 based on the sample of eight private commercial banks. In this study two type of statistical analysis was used to test the proposed hypotheses. These are descriptive statistics and regression analysis to see the effect (relationship) of explanatory variables on loan and advance of the banks in the study. The descriptive statistics of both dependent and independent variables were calculated over the sampled periods. This helps to convert the raw data in to a more meaning full form which enables the researcher to understand the ideas clearly by using mean, maximum, minimum and standard deviation. Then, correlation analyses between dependent and independent variables were made and finally a linear regression and t-test analysis was used to determine the relative impact of independent variable on loans and advances of private commercial banks in Ethiopia. To conduct this, the researcher uses statistical tools E-views 9 software package. The researcher has also performed diagnostic tests to ensure whether the assumptions of the classical linear regression model (CLRM) are violated or not.

3.6. Study Variables Description

3.6.1. Dependent Variable

➤ Loan and Advance

Loan is lending of money to individuals, organizations or any entity in which the borrower initially receives or borrows an amount of money, called principal from the lender, and obligated to pay back at later time. Advance' on the other hand, is a 'credit facility' granted by the bank relatively for short period of time. National Bank of Ethiopia defined Loans and advances as it is any financial assets of a commercial bank arising from a direct or indirect advances (i.e. unplanned overdrafts, participation in loan syndication, the purchase of loans from another lender, etc.) of commitment to advances funds by commercial bank to a person that are

conditioned on the obligation of the person to repay the funds, either on a specified date or dates or on demand, usually with interest. The term includes a contractual obligation of a commercial bank to advance funds to or on behalf of a person, claim evidenced by a lease financing transaction in which the commercial bank is the leaser. Overdraft facility to be funded by the commercial bank on behalf of a person, revocable or irrevocable documentary letters of credit, standby letters of credit, and guarantees or sureties issued on behalf of a borrower. To proxy loans and advances, natural logarithm of loan and advance was used.

3.6.2. Independent Variables

➤ Bank Size

Bank size is considered as an important determinant of bank lending decision (Berger and Udell, 2006, Uchida *et al.* 2007). Berger and Udell (2006) provide that large and complex banks tend to lend few loans to small scale firms. Stein (2000) explains that small banks have comparative advantages in producing soft information whereas large banks also have comparative advantages in lending based on hard information. On the other hand, when large and complex banks are able, through technical expertise, to process soft information about small scale firms, then there would be positive relationship between bank size and lending (Ladime J., Sarpong-Kumankoma E., and Kofi A. Osei, 2013). To proxy bank size, natural logarithm of total asset was used.

➤ Deposit

Bank deposits refer to money placed into a banking institution. Bank deposits are made to deposit accounts at a banking institution, such as savings accounts, current accounts, fixed time deposit accounts and money market accounts. The account holder has the right to withdraw any deposited funds, as set forth in the terms and conditions of the account. The "deposit" itself is a liability owed by the bank to the depositor. Most business organizations, especially in developing countries are highly dependent on bank loans as a source of capital and the ability of banks in giving loans depends much on their ability to attract deposits (Haron and Azmi, 2006). This is because an increasing trend in deposit mobilization implies more liquidity for the banks and more funds will be available for lending. To proxy volume of deposit, total deposit to total liability ratio was used. Therefore,

✚ *Deposit to total liability Ratio= Total Deposit/total liability*

➤ **Non-Performing Loan and Advance**

Non-performing loan and advance is a loan and advances whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with the contractual repayment terms of the loan and advance is in question. Loans and advances with a less than two years original repayment or maturity are non-performing when the principal and/or interest is due and uncollectable for 90 (ninety) consecutive days or more beyond the scheduled payment date or maturity. Whereas, loans having two or more than two years of maturity, are non-performing when the principal and/or interest is due and uncollectable for 12 (twelve) consecutive months or more beyond the scheduled payment date or maturity (National Bank of Ethiopia, Directive no. SBB/52/2012). To proxy Non-performing loan and advance, total non-performing loans and advances to total loans and advances ratio was used. Therefore,

✚ $NPLA \text{ Ratio} = \text{Total NPLA} / \text{Total Loans and Advance}$

➤ **Liquidity**

It is the ability to meet its financial obligations when they become due. Bank lending finances investments which are relatively illiquid assets, but it funds its loans with mostly short term liabilities. Liquidity can come from direct holdings in currency or on account at the Federal Reserve or other central bank. More commonly it comes from holding securities that can be sold quickly with minimal loss. This typically means highly creditworthy securities, including government bills, which have short-term maturities. As cited by Amano (2014), According to Pilbeam (2005), in practice the amount of liquidity held by banks is heavily influenced by loan demand that is the base for loan growth. If demand for loans is weak, then the bank tends to hold more liquid assets (i.e. short term assets), whereas if demand for loans is high they tend to hold less liquid assets since long term loans are generally more profitable. Therefore, loans and advances and bank liquidity are inversely related. To proxy liquidity, ratio of current asset to total asset was used. Therefore,

✚ $Liquidity \text{ Ratio} = \text{current asset} / \text{Total asset}$

➤ **Gross Domestic Product Growth (GDP)**

It gives information about the size of the economy and how the economy is performing. The growth rate of real GDP is often used as an indicator of the general health of the economy. In broad terms, an increase in real GDP is interpreted as a sign that the economy is doing well. GDP growth can be viewed in the following approaches. These are production, expenditure, and income approaches. The production approach sums the “value-added” at each stage of production, where value-added is defined as total sales less the value of intermediate inputs into the production process. The expenditure approach adds up the value of purchases made by final users. On the other side, Income approach sums the incomes generated by production (Tim Callen, International Monetary Fund, 2012).

The GDP growth rate is driven by the four components of GDP. By far, the most important driver of GDP growth is personal consumption, which includes retail sales. GDP growth is also driven by business investment, which includes construction and inventory levels. Government spending is the third driver of growth. The last but not the least is exports and imports. Exports drive growth, but increase in import has negative impact. Mathematically, $GDP = \text{Personal consumption expenditure} + \text{business investment} + \text{government spending} + (\text{export} - \text{import})$ (Kimberly Amadeo, 2016). For proxy of GDP, Annual Real GDP was used. Which adjusted GDP for price changes (i.e. inflation or deflation). This adjustment transforms the money-value measure, nominal GDP into an index for quantity of total output. To proxy GDP, the real GDP growth rate was used.

➤ **Interest Rate**

Interest rate is the amount charged, expressed as a percentage of principal, by a lender to a borrower for the use of assets. It is typically noted on an annual basis, known as annual percentage rate. Loanable funds theory states that interest rates will be determined by the supply and demand for funds. If people save more, there will be more funds for investment, this will reduce interest rates. If demand for borrowing increases, this will push up the cost of borrowing (Tejvan Pettinger, 2012). Inflation will also affect interest rate levels. The higher the inflation, the more interest rates are likely to rise. This occurs because lenders will demand higher interest

rate as compensation for the decrease in purchasing power of the money they will be repaid in the future (Reem Heakal).

NBE set the minimum saving and time deposit rates in Ethiopia. But commercial banks may pay higher interest rate than the minimum rate set by NBE. But the lending interest rate is fully liberalized, and hence there is no lower and upper lending interest rate in the country. Therefore, each bank determines their lending interest rates (NBE, 2016). To proxy interest rate, average lending interest rate of banks was used.

➤ **Cash Reserve Requirement**

The cash reserve requirement (also known as the cash reserve ratio) is the minimum amount of money that commercial banks must hold in reserve, usually given as a percentage of customer deposits. The cash is normally stored in a vault at the bank or with a central bank and cannot be invested or loaned to business or individuals. The requirement is set by each country's central bank and raising or lowering the reserve requirement will subsequently influence the money supply in the economy. Central banks used cash reserve requirement as a tool to control the liquidity of commercial banks in order to protect the bank against liquidity rush from its depositors in certain economic conditions.

Banks operating in Ethiopia shall open accounts with the National Bank of Ethiopia to be used as a reserve account. It exclusively be used to maintain the reserve balance requirement and no bank shall withdraw any money from its reserve account without prior approval of the Supervision Department of the National Bank of Ethiopia and deficiencies in reserve balance subjected to penalty. The reserve requirement shall be computed on the net deposit balance, i.e. excluding cash items in process of collection, shown at the end of each reporting week (National Bank of Ethiopia, Dir. No. SBB/55/2013). For proxy of cash reserve requirement, annual cash reserve requirement ratio of commercial banks was used.

3.7. Model Specification

The data used in this study includes both time series and cross-sectional data enabled to use panel/longitudinal data model which is deemed to have advantages over cross sectional and time series data methodology. Panel data involves the pooling of observations on the cross-sectional

over several time periods. As Chris Brook (2008) stated the advantages of using panel data set; first and perhaps most importantly, it can address a broader range of issues and tackle more complex problems with panel data than would not be possible with pure time-series or pure cross-sectional data alone. Second, it is often of interest to examine how variables, or the relationships between them, change dynamically (over time). To do this using pure time-series data would often require a long run of data simply to get a sufficient number of observations to be able to conduct any meaningful hypothesis tests. But by combining cross-sectional and time series data, one can increase the number of degrees of freedom, and thus the power of the test, by employing information on the dynamic behavior of a large number of entities at the same time. The additional variation introduced by combining the data in this way can also help to mitigate problems of multicollinearity that may arise if time series are modeled individually. In addition, by structuring the model in an appropriate way, we can remove the impact of certain forms of omitted variables bias in regression results. Thus panel/longitudinal regression model was used as follows:

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

With subscript I denote the cross-section and t representing the time-series dimension. The left-hand variable Y_{it} is the dependent variable, α is the intercept term, β is a $k \times 1$ vector of parameters to be estimated on the explanatory variables, and X_{it} is a $1 \times k$ vector of observations on the explanatory variables, $t = 1, \dots, T$; $i = 1, \dots, N$. Therefore the general models which incorporate all of the variables to test the hypotheses of the study were:

$$LOA = f(\text{BS}, \text{Dep}, \text{NPLA}, \text{LIQ}, \text{GDP}, \text{IR}, \text{CRR}, \text{U}) \dots \dots \dots (1)$$

Where U contains other variables not explicitly included in the model.

The explicit form of equation (1) above was represented as follows:

$$LOA = \alpha + \beta_1 BS_{it} + \beta_2 Dep_{it} + \beta_3 NPLA_{it} + \beta_4 LIQ_{it} + \beta_5 GDP_t + \beta_6 IR_t + \beta_7 CRR_t + \mu_{it} \dots \dots (2) \text{ Where:}$$

LOA_{it} : Total Loans and Advances of i^{th} bank on year t

BS_{it} : Bank size of i^{th} bank on year t

Dep_{it} : Ratio of deposit to total liability of i^{th} bank on year t

$NPLA_{it}$: Ratio of nonperforming loan and advance to total loan and advance of i^{th} bank on year t

LIQ_{it} : Liquidity Ratio of Liquid Asset to Total Asset of i^{th} bank on year t

GDP_t : Real Gross Domestic Product growth rate on year t

IR_t : average lending interest rate on year t

CRR_t : Cash Reserve Requirement Ratio on year t

α : intercept of the regression line

β (i=1-8) : coefficients to be estimated

Table 3.1: Summary of variables used in the study and their expected sign/impact

Variables	Description	Expected Effect/Sign
<i>DEPENDANT VARIABLE</i>		
Total Loans and Advance	Log of Total loans and advances of the banks	NA
<i>INDEPENDENT VARIABLES</i>		
Bank size	Log of Total Asset of the banks	Positive
Deposit	The ratio of Total Deposit to Total Liability	Positive
Nonperforming Loans and Advance	The ratio of Nonperforming Loans and Advances to Total Loan and Advance	Negative
Liquidity Ratio	The ratio of Current Asset to Total Asset	Negative
Gross Domestic Product	Annual Real Gross Domestic Product growth rate	Positive
Interest Rate	Annual Average Lending Interest Rate of banks	Negative
Cash Required Reserve Ratio	Annual Cash Reserve Requirement Ratio	Negative

Source: own

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

In this chapter, detail analyses about the descriptive statistics and regression result have been made. Specifically, this chapter has included seven sections. The first section presented descriptive statistics of the dependent and independent variables. The second section presented the correlation analysis result of dependent and independent variables. Section three presented the classical linear regression model assumptions diagnostic test results. Section four deals about choosing of fixed effect model vs. random effect model which is followed by Panel unit root test in the fifth section. Finally, the result of regression analysis, discussion of regression result and summary of findings presented under section six, seven and eight respectively.

4.1. Descriptive Statistics

This section presents the summary of data used in the regression model and provides statistical descriptive analysis of the dependent and independent variables. In the following table, the descriptive statistics of total loans and advances which is dependent variable of the study and the remaining independent variables which are bank size, deposit, liquidity, nonperforming loan and advance, real GDP, cash reserve requirement and interest rate is presented.

Table 4.1: Descriptive statistics of dependent and independent variables

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
LOA	21.2335	21.4854	22.4046	17.8480	0.8032	80
BS	22.5653	22.7744	24.1114	19.3990	0.9647	80
DEP	0.8672	0.8857	0.9422	0.0765	0.1007	80
NPLA	0.0098	0.0061	0.0739	0.0000	0.0124	80
LIQ	0.3544	0.3371	0.6353	0.1356	0.1288	80
CRR	0.1050	0.1250	0.1500	0.0500	0.0475	80
IR	0.1186	0.1188	0.1275	0.1050	0.0056	80
GDP	0.1023	0.1037	0.1179	0.0800	0.0112	80

Source: NBE and own computation through Eviews 9

As shown in the above table, total loans and advances which is the dependent variable and the remaining independent variables are statistically described by using mean, median, maximum, minimum and standard deviation of 80 observations.

The mean value of total loan and advances which is dependent variable was 21.2335 with a standard deviation of 0.8032. The standard deviations indicates that there was high dispersion in total loans and advances from its mean for the private commercial banks in Ethiopia when compared to the variation in independent variables. The maximum and minimum values were 22.4046 and 17.8480 respectively. The maximum value was the total loans and advances of Dashen Bank in 2016 while the minimum value was Lion Bank's performance in 2007.

The bank size's mean value was 22.5653 with a standard deviation value of 0.9647. The standard deviation indicated that among the independent variables, bank size was highly dispersed from its mean with maximum and minimum value of 24.1114 and 19.3990 respectively. The maximum value was the bank size of Awash Bank in 2016 while the minimum value was Lion's Bank in 2007.

The mean value of Deposit was 0.8672 with a standard deviation of 0.1007. This indicates that 86.72% of private commercial banks liability was deposit. The maximum and minimum volume of deposit was 0.9422 and 0.0765 respectively. The maximum and minimum values were in Cooperative Bank of Oromia in 2007 and 2008 when its deposit was 94.22% and 7.65% of its total liability.

The mean value of Nonperforming Loan and Advance was 0.010 with a standard deviation of 0.0124. Which means that only 1% of total loans and advances disbursed by private commercial banks were uncollectable on average during the study period. The maximum and minimum was 0.0738 and 0.0000 respectively. The maximum value was in BOA'S NPLA during 2008.

The last bank-specific determinant of loan and advance is liquidity. Its mean value was 0.3544 with standard deviation of 0.0124. During the study period, of the total asset of private commercial banks in Ethiopia had 35.44% liquid asset on average. The maximum and minimum values of liquidity were 0.6353 and 0.1356 respectively. The maximum value indicates Lion

Bank's liquidity during 2008. Therefore, Lion Bank had 63.53% liquid asset in comparison to its total asset. Whereas the minimum value indicates the liquidity position of Nib International Bank in 2015 which was it had minimum liquid asset during the study period.

The macroeconomic independent variables are Cash Reserve Requirement, Interest Rate and real GDP. The mean value of Cash Reserve Requirement was 10.50% of customers deposit with standard deviation of 0.0475. The maximum and minimum cash reserve requirement was 15% and 5% during the study period. On the other side mean value of Interest Rate that was lending interest rate was 11.86% with standard deviation of 0.0056. The standard deviation of interest rate show high stability during the study period compared to the other variables. The maximum and minimum average lending interest rate during the study period was 12.75% and 10.50% respectively. At last, the mean value of real GDP during the study period was 10.23% with standard deviation of 0.0112. The maximum and minimum values of real GDP were 11.79% in 2007 and 8% in 2016 respectively.

4.2. Correlation Analysis

In this section, the correlation between the dependent variable and the independent variables have been presented and analyzed. Correlation is a way to index the degree to which two or more variables are associated with or related to each other. The 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). When the correlation is 0, it means that there is no correlation at all.

According to Brooks (2008), if it is stated that y and x are correlated, it means that y and x are being treated in a completely symmetrical way. Thus, it is not implied that changes in x cause changes in y , or indeed that changes in y cause changes in x rather, it is simply stated that there is evidence for a linear relationship between the two variables, and that movements in the two are on average related to an extent given by the correlation coefficient.

Table 4.2: Correlation between the dependent and independent variables

	BS	DEP	NPLA	LIQ	CRR	IR	GDP
LOA	0.8518	-0.0943	-0.2648	-0.5275	-0.3436	0.3798	-0.3289

Source: NBE and own computation through Eviews 9

The sample size is the key element to determine whether or not the correlation coefficient is different from zero/statistically significant. As a sample size approaches to 100, the correlation coefficient of about or above 0.20 is significant at 5% level of significance (Meyers et al. 2006). The sample size of the study was 8*10 matrixes of 80 observations. Hence the study used the above justification for significance of the correlation coefficient.

Bank size was positively and highly correlated with total loans and advances with coefficient of 0.8518. The linear relationship between BS and LOA was statistically different from zero. Therefore, it correlation was statistically significant and the result was in line with our expectation. Volume of Deposit was negatively correlated with total loans and advances with coefficient of -0.0943. The correlation between DEP and LOA opposed the expectation of the study and its correlation was statistically insignificant. The other microeconomic determinant NPLA had negative correlation with LOA with correlation coefficient of - 0.2649. Therefore, its correlation meets the study's expectation and also it was statistically significant. Liquidity and LOA were negatively correlated with correlation coefficient of - 0.5275. The result of correlation meets our expectation and its correlation was statistically significant.

The correlation coefficient between CRR, IR and RGDP with LOA was -0.3436, 0.3798 and -0.3289 respectively. The correlation result between CRR and LOA meet the study's expectation and it was significant. The IR's correlation with LOA was not meeting the expectation of the study and its correlation was significant too. Lastly, the correlation of GDP and LOA was not in line with our expectation and it was significant.

4.3. Testing Assumptions of Classical Linear Regression Model (CLRM)

In this section, the researcher carried out relevant diagnostic testing to identify for any violation of the underlining assumption of the classical linear regression model (CLRM). Five assumptions were made which ensures that the estimation technique, ordinary least squares (OLS), to have a number of desirable properties, and that hypothesis tests regarding the

coefficient estimates could validly be conducted. Specifically, it was assumed that average values of the error-term is zero, the variance of the errors are constant (homoscedasticity), the covariance between the error-terms are zero (no autocorrelation), the error-terms are normally distributed (normality) and explanatory variables are not correlated (absence of multicollinearity).

4.3.1. Test for Mean Value of the Error Term Is Zero, ($E(U_t) = 0$) Assumption

The first CLRM assumption requires the average value of the errors term should be zero. As per Brooks (2008), if a constant term is included in the regression equation, this assumption will never be violated. Therefore, since the constant term was included in the regression equation, this assumption will not to be violated.

4.3.2. Test of Heteroscedasticity, ($\text{Var}(u_t) (\sigma^2 < \infty)$)

The second assumption of CLRM is that, the variance of the error-term 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*. If OLS is still used in the presence of heteroscedasticity, the standard errors could be wrong and hence any inferences made could be misleading (Brook, 2008). Therefore, to test the existence of heteroscedasticity, the white test is used in this study.

Hypothesis:

H_0 : the error-terms are homoscedasticity

H_1 : the error terms are heteroscedastic

Table 4.3.1: White's test of heteroscedasticity

Heteroskedasticity Test: White

F-statistic	1.639804	Prob. F(34,45)	0.0601
Obs*R-squared	44.26918	Prob. Chi-Square(34)	0.1117
Scaled explained SS	37.27216	Prob. Chi-Square(34)	0.3209

Source: NBE and own computation through Eviews 9

As we can see from the above white test, 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 in excess of 0.05. The third version of the test statistic, scaled explained SS also gives the same conclusion. Therefore, we failed to reject the null hypothesis. Therefore, the entire regression model used in this study reveals that the variance of the error term is constant or homoscedastic.

4.3.3. Test for absence of autocorrelation assumption ($cov(ui, uj) = 0$ for $i \neq j$)

This assumption states that the covariance between the error terms over time (or cross-sectionally, for that type of data) is zero. In other words, it is assumed that the errors are uncorrelated with one another. If the errors are correlated with one another, it would be stated that they are ‘autocorrelated’ or that they are ‘serially correlated’.

To test the absence of autocorrelation in between the error terms, DW test is used in this study. DW test has 2 critical values: an upper critical value (d_U) and a lower critical value (d_L), and there is also an intermediate region where the null hypothesis of no autocorrelation can neither be rejected nor not rejected. The rejection, non-rejection, and inconclusive regions are shown on the number line below.

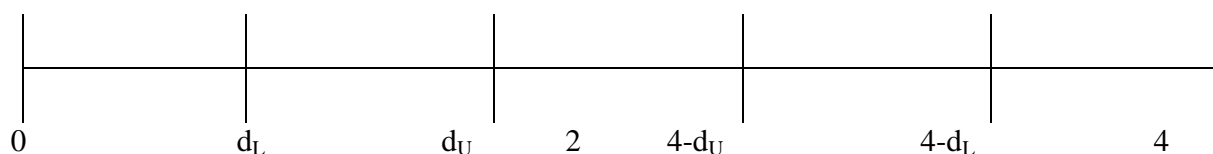
Hypothesis:

H0: there is no autocorrelation

H1: there is autocorrelation

Figure 4.3.1: DW Test

Reject H0: Positive Autocorrelation	Don't Reject H0: No evidence of Autocorrelation	Reject H0: Negative Autocorrelation
Inconclusive	Inconclusive	



The null hypothesis is rejected and the existence of positive autocorrelation presumed if DW is less than the lower critical value (d_L); the null hypothesis is rejected and the existence of negative autocorrelation presumed if DW is greater than 4 minus the lower critical value ($4-d_L$); the null hypothesis is not rejected and no significant residual autocorrelation is presumed if DW is between the upper critical value (d_U) and 4 minus the upper critical limits ($4-d_U$) (Brooks 2008).

The study has seven explanatory variables and eighty observations. As per the DW test table, seven explanatory variables with 80 observation at 1% level of significance, the d_L and d_U values are 1.312 and 1.683, respectively. Accordingly, the value of $4-d_U$ and $4-d_L$ are 2.317 and 2.688, respectively. The DW value of the study is 1.384 which lies in inconclusive region where the existence or nonexistence of autocorrelation is not evidenced.

4.3.4. Test for Multicollinearity

One of the assumptions of the classical linear regression model (CLRM) is that there is no exact linear relationship among regressors. If there is one or more such relationships among the regressors, it is called multicollinearity or collinearity (D. Gujarati, 2012). In any practical context, the correlation between explanatory variables will be non-zero, although this will generally be relatively benign in the sense that a small degree of association between explanatory variables will almost always occur but will not cause too much loss of precision. However, a problem occurs when the explanatory variables are very highly correlated with each other (Brook, 2008). As cited by Berhanu A., According to Lewis-Beck (1993) suggestion, in order to find out the multicollinearity problem, the correlations among the independent variables should be examined and the existence of correlation of about 0.8 or larger indicates a problem of multicollinearity.

Table 4.3.2: Correlation Matrix of Explanatory Variables

CORR	BS	DEP	NPLA	LIQ	CRR	IR	GDP
BS	1.0000	-0.1228	-0.1450	-0.5987	-0.6101	0.4723	-0.4700
DEP	-0.1228	1.0000	-0.1630	0.0849	0.1170	-0.2191	0.2359
NPLA	-0.1450	-0.1630	1.0000	0.1141	0.1192	-0.1254	0.1411
LIQ	-0.5987	0.0849	0.1141	1.0000	0.7672	-0.1027	0.4237
CRR	-0.6101	0.1170	0.1192	0.7672	1.0000	-0.3582	0.5826
IR	0.4723	-0.2191	-0.1254	-0.1027	-0.3582	1.0000	-0.7130
GDP	-0.4700	0.2359	0.1411	0.4237	0.5826	-0.7130	1.0000

Source: NBE and own computation through Eviews 9

In the above table, correlation matrix of seven explanatory variables had been estimated. The results show that the highest correlation of 0.7672 existed between liquidity and cash required reserve followed by correlation coefficient of -0.7130 in which inverse relation existed between interest rate and GDP. Generally, it can be concluded that there is no multicollinearity in the study since there was no correlation which is approached or exceed 0.80.

4.3.5. Test of Normality ($ut \sim N(0, \sigma^2)$)

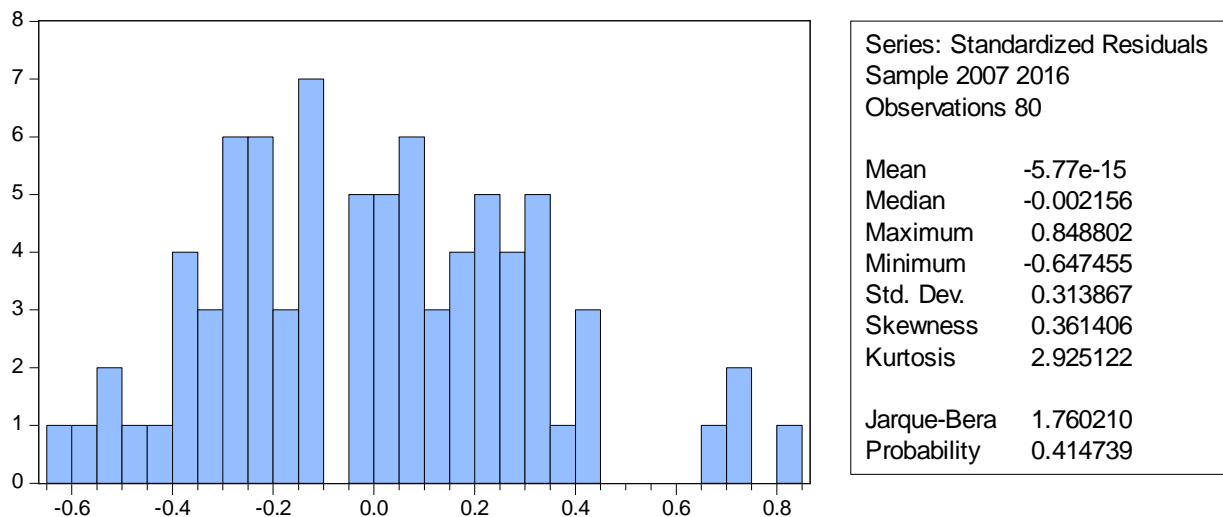
This assumption assumes that the error term ut in the regression model is normally distributed. This test is important to check whether the error term is normally distributed. There are several tests of normality, but the most popularly used test is the Jarque-Bera (JB) test of normality. JB uses the property of a normally distributed random variable that the entire distribution is characterized by the first two moments, the mean and the variance. The standardized third and fourth moments of a distribution are known as its *skewness* and *kurtosis*. Skewness measures the extent to which a distribution is not symmetric about its mean value and kurtosis measures how fat the tails of the distribution are. A normal distribution is not skewed and is defined to have a coefficient of kurtosis of 3. Jarque-Bera formalizes this by testing the residuals for normality and testing whether the coefficient of skewness and kurtosis close are zero and three respectively. If the residuals are normally distributed, the histogram should be bell-shaped and the Jarque-Bera statistic would not be significant. This means that the p -value should be greater than 0.05 to not reject the null of normality at the 5% level.

Hypothesis:

H0: residuals follow a normal distribution

H1: residuals do not follow a normal distribution

Figure 4.3.2: Normality test for residuals



Source: *NBE and own computation through Eviews 9*

As shown in the histogram above kurtosis close to 3 (i.e. 2.9251) and skewness approaches to 0 (i.e. 0.3614). The Jarque-Bera statistics was not significant even at 10% level of significance as per the P-values shown in the histogram (i.e.0.414739). Hence, null hypothesis of the residuals follows a normal distribution is failed to reject at 5 percent of significant level. Hence, the error terms are normally distribution.

4.4. Fixed effect model (FEM) vs. Random effect model (REM)

There are broadly two classes of panel estimator approaches that can be employed in financial research: *fixed effects* models and *random effects* models. Choosing one of the two models depends on the assumption we make about the likely correlation between the cross-section specific error component u_i and the regressors are uncorrelated. To choose the appropriate model, a test devised by Hausman is used. If the p value of the test is less than 5%, we will reject the null hypothesis. Therefore, fixed effect model is appropriate and vice versa.

Hausman hypothesis:

H_0 : Random effect model is appropriate

H_1 : Fixed effect model is appropriate

Table 4.4. Hausman test

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

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

Source: NBE and own computation through Eviews 9

As we can see from the above Hausman specification test, the P-value of the test is 1.0000, which is more than 5% level of significance. Hence, the null hypothesis failed to reject at 5 percent of significant level. Therefore, Random effect model is appropriate for the study.

4.5. Panel unit root test

In regression analysis involving time series data, a critical assumption is that the time series under consideration is stationary. A time series is stationary if its mean and variance are constant over time and the value of covariance between two time periods depends only on the distance or gap between the two periods and not the actual time at which the covariance is computed. A time series is strictly stationary if all moments of its probability distribution and not just mean and variance are invariant over time (D. Gujarati). Panel root test is used to check the stationarity of the data.

In all panel unit root test methods,

H_0 : the panel data has unit root (Non-stationary)

H_1 : the panel data has not unit root (Stationary)

Table 4.5: Panel unit root test

Panel unit root test: Summary
Series: D(LOA)
Date: 05/21/17 Time: 12:57
Sample: 2007 2016
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 1
Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-8.66454	0.0000	8	62
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.26877	0.0000	8	62
ADF - Fisher Chi-square	51.7690	0.0000	8	62
PP - Fisher Chi-square	67.2193	0.0000	8	64

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Source: *NBE and own computation through Eviews 9*

As we can see in the above in all methods of testing stationarity (Levin, Lin & Chu, Pesaran and Shin W-stat, Fisher Chi-square (ADF) Fisher Chi-square (PP)), we reject the null hypothesis since the probability in all tests was less than 5%. Therefore, the total loan and advance is stationary after first difference.

4.6. Results of Regression Analysis

This section discusses the regression results of random effect model that determines the loans and advances of private commercial banks in Ethiopia. In this study, natural logarithm was used to measure the dependent variable that is loans and advance. The model and the regression result is as follow:

$$LOA = \alpha + \beta_1 BS_{it} + \beta_2 Dep_{it} + \beta_3 NPLA_{it} + \beta_4 LIQ_{it} + \beta_5 GDP_{it} + \beta_6 IR_{it} + \beta_7 CRR_{it} + \mu_{it}$$

Table 4.6: Model regression result

Dependent Variable: LOA
 Method: Panel EGLS (Cross-section random effects)
 Date: 05/21/17 Time: 16:35
 Sample: 2007 2016
 Periods included: 10
 Cross-sections included: 8
 Total panel (balanced) observations: 80
 Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.106443	1.955626	1.588464	0.1166
BS	0.668926	0.079115	8.455105	0.0000**
DEP	-0.333657	0.388258	-0.859369	0.3930
NPLA	-10.31275	3.081637	-3.346518	0.0013**
LIQ	-2.512147	0.504441	-4.980060	0.0000**
CRR	8.283009	1.467266	5.645198	0.0000**
IR	23.79694	11.16791	2.130832	0.0365*
GDP	6.064436	5.356772	1.132107	0.2613

Effects Specification		S.D.	Rho
Cross-section random		0.153769	0.1997
Idiosyncratic random		0.307844	0.8003

Weighted Statistics			
R-squared	0.778147	Mean dependent var	11.35785
Adjusted R-squared	0.756578	S.D. dependent var	0.620041
S.E. of regression	0.305915	Sum squared resid	6.738025
F-statistic	36.07711	Durbin-Watson stat	1.384318
Prob(F-statistic)	0.000000		

** and * denote significance level at 1% and 5% respectively

Source: NBE and own computation through Eviews 9

The above table shows the result of the regression analysis on the determinants of private commercial banks' lending performance in Ethiopia where loan and advance is the dependent variable. The coefficient of determination in this model is given by R-squared of 0.7781 and adjusted R squared of 0.7566, which indicates 75.66% of variation in total loan and advance of private commercial banks in Ethiopia was explained by variation on bank size, deposit, nonperforming loan and advance, liquidity, cash reserve requirement, lending interest rate and

real gross domestic product during the study period. The remaining 24.34% variation in loans and advance was explained by other determinants which are not included in the model. Therefore, the explanatory power of the model is high. The value of F-statistics is 36.07711 with p-value of 0.000000 which is used to measure the overall significance of the model. Thus, the p-value of F-statistics is zero and the null hypothesis is rejected and the model is significant at 1% significant level.

Among explanatory variables, bank size, nonperforming loan and advance, liquidity and cash reserve requirement had statistically significant impact on loans and advance at 1% level of significance. Lending interest rate on the other side had statistically significant impact on loans and advance of private commercial banks in Ethiopia at 5% of significance level. The remaining two variables which are deposit and GDP had not significant impact on loans and advance. The coefficient sign of bank size and GDP was positive and in line with our expectation. The coefficient of NPLA and liquidity which was negative was also in line with the expectation of the study. However the coefficient sign of the remaining explanatory variables which include deposit, cash reserve requirement and lending interest rate were in the opposite side of our expectation.

4.7. Discussion of the Regression Results

The relationship between the dependent variable, loans and advance and each explanatory variables discussed in this section based on the finding of the study. Natural logarithm was used to measure loan and advance and the explanatory variables were measured by using different tools. Bank size was measured by natural logarithm of total asset; the ratio of total deposit to total liability was used for deposit; NPLA measured by the ratio of nonperforming loan and advance to total loan and advance disbursed by the banks; the other microeconomic variable which is liquidity was the ratio of liquid asset to total asset. The macroeconomic explanatory variables, CRR which is measured by using each years' requirement of commercial banks cash reserve which is percentage of customers deposit was used. The other macroeconomic determinant is interest rate and it is represented by average lending interest rate of commercial

banks for each year. Finally, GDP is measured by using the real GDP growth rate of a country in each year.

4.7.1. Bank Size (BS) and Loans and Advances (LOA)

Bank size, which was measured by using natural logarithm was hypothesized that the bank size has positive and significant impact on loans and advances of private commercial banks in Ethiopia. The regression result indicated that bank size had statistically significant and positive impact on loans and advances of private commercial banks in Ethiopia. The coefficient of bank size was 0.6689 and which indicates that holding other independent variables constant, when bank size increased by 1%, total loans and advances of sampled private commercial banks would be increased by 0.6689% at 1% level of significance. This is due to the fact that large banks have economies of scale advantage to provide loans and advance efficiently and their capability to provide large amount of loans and advance when need by the borrowers. Additionally, large banks have better capability of providing different loans and advances menu to their customers and they are more accessible to their borrowers. The finding is consistent with the prior studies conducted by Serpil TOMAK (2013), Mohamed Aymen Ben Moussa (2016), Raj Bhattarai (2016), Amano Getahun (2014) and Mitiku Malede (2014).

4.7.2. Deposit Ratio (Dep) and Loans and Advances (LOA)

Deposit ratio, which was measured by using the ratio of total deposit to total liability was hypothesized that the deposit ratio has positive and significant impact on loans and advances of private commercial banks in Ethiopia. As we can see from the above regression result, the ratio of deposit to total liability had insignificant effect on loans and advances of private commercial banks in Ethiopia even at 10% level of significance. The coefficient of deposit ratio was -0.3337% and which indicates that other independent variables remain constant, when deposit to liability ratio increased by 1%, total loans and advances of sampled private commercial banks would be decreased by 0.3337%. The result of the study opposed our expectation even though its effect was statistically insignificant. Therefore, we concluded that deposit had negative but insignificant effect on loans and advances of private commercial banks. The possible reason could be as follows. When the increment of deposit is more than the overall liability increment of

the bank, it will result cash reserve requirement. Because, cash reserve requirement is a percentage of deposit liability not all total liability. Therefore, banks to satisfy this reserve requirement, forced to minimize their lending. Additionally customer deposit is payable on demand so when deposit liability to total liability increased, the banks forced to reduce their lending to maintain their liquidity since the customers deposit is payable on demand. Inversely, when the ratio of deposit to total liability decrease it means that there is increment in other liabilities than deposit. So the issue of cash reserve requirement will be minimized and therefore, there will get space for lending.

Even though the effect of deposit on loans and advances in this study was insignificant, the inverse relationship between deposit and loans and advances is supported by only by Mohamed Aymen Ben Moussa (2016), who studied the determinants of bank lending in Tunisia. The other studies conducted by Omowunmi Olokoyo (2011), Amano Getahun (2014), Berhanu Abebe (2016), Akinyomi Oladele (2014), and Mitiku Malede (2014) were opposed our finding.

4.7.3. NPLA and Loans and Advances

NPLA, which was measured by using the ratio of nonperforming loan and advance to total loans and advance was hypothesized that the NPLA has negative and significant impact on loans and advances of private commercial banks in Ethiopia. As the regression result revealed in table 4.6.1., NPLA ratio had statistically significant effect on loans and advance of private commercial banks with coefficient of -10.3128. The coefficient indicated that other independent variables remain constant, when NPLA ratio decreased by 1%, total loans and advance would be increased by 10.3128% with 1% level of significance. The negative coefficient indicated the inverse relationship of NPLA and loans and advances of private commercial banks during the study period. Therefore, the null hypothesis of NPLA has positive and significant effect on loans and advance was rejected.

The rise of nonperforming loans and advances implies that the bank is losing its asset which was receivable from the borrowers or the borrowers failed to make the required payment of principal and interest fully or partially. Consequently, it will increase the bank's credit risk. The higher the exposure of the banks to credit risk, the higher the tendency of the banks to experience financial crisis. Therefore, to escape from this unfavorable situation, the banks forced to critically review

its loans and advance disbursement and focused on low risky loans and advance. Additionally, if the nonperforming loans and advance increased, it leads the bank to lose its asset and it has adverse effect on its profitability. Therefore, this also this makes the bank to reduce its loans and advance.

The result of the study is consistent with the prior studies of Serpil TOMAK (2013), Amano Getahun (2014), Doriana Cucinelli (2015), Berhanu Abebe (2016). But it contradicts the finding of Mitiku Malede (2014), who wrote article on the determinants of commercial banks' lending in Ethiopia.

4.7.4. Liquidity and Loans and Advances

Liquidity, which was measured by using the ratio of liquid asset to total asset was hypothesized that the liquidity has negative and significant impact on loans and advances of private commercial banks in Ethiopia. The above regression result revealed that there is inverse relationship between liquidity and loan and advance having -2.5121 coefficient. This means, when liquid asset to total asset ratio increased by 1%, loan and advance of the sampled private commercial banks would be reduced by 2.5121%. Liquidity had negative and statistically significant impact on loans and advance of private commercial banks with 1% of level of significance. Therefore, the result of this study is in line with our expectation and we reject the null hypothesis of liquidity has significant and positive impact on loans and advance.

The inverse relationship between liquidity and loans and advance of commercial banks is due to the fact that lending is transforming of liquid assets to loans and advance in which most of loans are illiquid. Therefore, when there is low liquidity ratio, it could mean that there is large amount of long term asset and in commercial banks case, there is large amount of loans. This argument is supported by the prior findings of Raj Bhattarai (2016) , Amano Getahun (2014), Yuga Raj Bhattarai (2016), Moussa M. & Hedfi Chedia (2016). But it opposed the finding of Berhanu Abebe (2016).

4.7.5. Cash Reserve Requirement (CRR)

Cash reserve requirement, which was measured by using cash reserve requirement ratio of National Bank of Ethiopia, which is percentage of deposit of customers' was hypothesized that cash reserve requirement has negative and significant impact on loans and advances of private

commercial banks in Ethiopia. As we can see from the above regression result table 4.6.1., when cash reserve requirement increased by 1%, loans and advance disbursement of sampled private commercial banks increased 8.283009% at 1% significance level. The result revealed that cash reserve requirement had positive and statistically significant impact on loans and advance with 1% significance level. The regression result is in contrary with our expectation and we failed to reject the null hypothesis of CRR has positive and significant impact on loans and advances of private commercial banks. Even though the result was not in line with our argument, our argument for the inverse relationship was based on the fact that the higher the reserve requirement by the national bank, the lower the amount that can be provided as loan and advance to the borrowers. Because it reduces the amount to be provide as loans and advance.

The result of this study was not consistent with the finding of Yuga Raj Bhattarai (2016), Berhanu Abebe (2016) finding. But it is consistent with Mitiku Malede (2014) finding on positive impact of CRR on lending performance of commercial banks even though its impact was insignificant.

4.7.6. Interest Rate (IR) and Loans and Advances

Interest rate, which was measured by using the average lending interest rate of commercial banks was hypothesized that the interest rate has positive and significant impact on loans and advances of private commercial banks in Ethiopia. As we can see from the above regression table, interest rate which is represented by the average lending interest rate of commercial banks had positive and statistically significant impact on loans and advance of private commercial banks during the study period with regression coefficient of 23.7969. This can be interpreted as when interest rate increased by 1%, loans and advance of the private commercial banks was increased by 23.7969% at 5% of significance level. The output of regression is in not with our expectation and we failed to reject the null hypothesis of interest rate has positive and significant impact on loans and advances. The regression result of this study is in line with the prior studies conducted by Mohamed Aymen Ben Moussa (2016) and Olokoyo F. (2011) but not with Serpil TOMAK, Ujuju & Etale (2016), Berhanu Abebie (2016) and Amano Getahun (2014)'s findings.

The argument for negative relationship between interest rate and loans and advances was having the fact that when lending interest rate increases, the demand for borrowing will reduced but the

result revealed the positive relationship. This could be because of borrowers were not sensitive for the interest rate change but the private commercial banks were sensitive. Therefore, the supply of loans and advances by banks was affected by lending interest rate and following the increment of interest rate, their disbursement of loans and advances was increased and vice versa. This result was also due to fact that interest income is the main income for commercial banks and they become sensitive for the interest rate fluctuation.

4.7.7. Gross Domestic Product Growth (GDP) and Loans and Advances

GDP, which was measured by using the GDP growth rate was hypothesized that the GDP has positive and significant impact on loans and advances of private commercial banks in Ethiopia. As it is shown in the above model regression result table, GDP which was measured by real GDP growth rate of each year, its effect in loans and advance of private commercial banks was not statistically significant with 6.0644 regression coefficient. It indicates that when real GDP increased by 1%, loans and advance disbursement of the private commercial banks was increased by 6.0644% but it was not statistically significant. Therefore, we fail to reject the null hypothesis of GDP has positive and significant effect on loans and advance. The argument for GDP's significant impact on loans and advances was that when the economy grows up, the businesses will be also boosted and therefore the borrowers will get good environment for investing. Since debt financing is one way of getting fund for investors, they will borrow from the commercial banks and consequently the loan and advance will grow parallelly. But in this study, even though GDP has positive impact on lending performance, it is not statistically significant.

The positive relationship between GDP and loans and advances was supported by previous findings which were conducted by Ujuju and Etale (2016), Omowunmi Olokoyo (2011), Berhanu Abebe (2016) and Mitiku Malede (2014) while the inverse relationship was resulted in the findings of Mohamed Aymen Ben Moussa (2016) and Ladime, Kumankoma and Osei (2013).

In general, from the above regression result table 4.6.1., it was clearly identified that among explanatory variables, bank size, cash reserve requirement, and interest rate had positive and statistically significant impact on loans and advances while nonperforming loans and advances and liquidity had negative and statistically significant impact on loans and advances of private commercial banks during the study period.

4.8. Summary of Findings

The main objective of this study was to examine the bank-specific and macroeconomic factors that determine the lending performance of private commercial banks in Ethiopia. To achieve this objective, four bank specific and three macroeconomic determinants of private commercial banks' lending performance were used and analyzed by using random effect regression model. The bank-specific variables include bank size, deposit, nonperforming loans and advances and liquidity. The macroeconomic variables on the other side include cash reserve requirement, interest rate and gross domestic product. The study used panel data of eight private commercial banks operating from 2007 to 2016.

The dependent variable, which is private commercial banks' lending performance, was measured by using natural logarithm of total loan and advance disbursed by the banks. Among bank specific variables, Bank Size (BS), which was measured by natural logarithm of total asset, had positive and statistically significant effect on private commercial banks' lending performance. Both Nonperforming Loan and Advance (NPLA), which was measured by the ratio of nonperforming loan and advance to total loan and advance and Liquidity (LIQ), which was measured by the ratio of liquid asset to total asset had negative and statistically significant impact on loan and advance of private commercial banks. From bank-specific explanatory variables of the study, only Deposit (Dep) which was measured by the ratio of deposit to total liability had negative but statistically insignificant effect on private commercial banks' lending performance.

On the other side, among macroeconomic variables, both Cash Reserve Requirement ratio (CRR) and Lending interest rate (IR), which was measured by average lending interest rate of commercial banks, had positive and statistically significant impact on private commercial banks' lending performance. GDP, another macroeconomic variable of the study and measured by using real GDP growth rate had positive but statistically insignificant impact on private commercial banks' lending performance.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

This chapter deals with the major conclusions and recommendations based on the findings of the study in the previous chapter. The chapter is organized in to two sub-sections, the first section presented the major conclusions of the study and the second section deals with the recommendation drawn from the study.

5.1. Conclusions

The main objective of this study was to examine the macroeconomic and bank-specific factors that determine the lending performance of private commercial banks in Ethiopia. To achieve this objective, four bank specific and three macroeconomic determinants of private commercial banks' lending performance were used and examined. The bank-specific variables include bank size, deposit, nonperforming loans and advances and liquidity. The macroeconomic variables on the other side includes gross domestic product, interest rate and cash reserve requirement. The study used panel data of eight private commercial banks operating from 2007 to 2016. The bank specific data was collected from audited annual financial reports of the sampled commercial banks and the macroeconomic data were collected from NBE.

Descriptive statistics, correlation analysis and random effect regression model was used to identify and examine the determinants of private commercial banks' lending performance in Ethiopia by using natural logarithm of total loans and advance as dependent variable. Natural logarithm of total asset (BS), deposit to total liability ratio (Dep), nonperforming loan and advance to total loan and advance ratio (NPLA), liquid asset to total asset ratio (LIQ), cash reserve requirement ratio (CRR), lending interest rate (IR) and real gross domestic product growth rate (GDP) were dependent variable of the study. The regression result indicated that 75.66% of variation in total loan and advance of private commercial banks in Ethiopia was explained the above explanatory variables during the study period.

Before performing the regression analysis, the five CLRM assumptions of mean value of error term is zero, homoscedasticity, absence of autocorrelation, absence of multicollinearity and normality were tested and fulfilled in this study. Hausman test was used to choose the

appropriate model and a random effects model was chosen. The panel unit root test was also used to check the whether the variance of error terms was constant over time and the test justifies its stationarity.

The result of this study confirmed that, among the explanatory variables; bank size, cash reserve requirement, and interest rate had positive and statistically significant impact on loans and advances while nonperforming loans and advances and liquidity had negative and statistically significant impact on loans and advances of private commercial banks during the study period. The remaining variables which are deposit and gross domestic product had no statistically significant impact on loans and advances as expected.

The positive and significant impact of bank size was due to the fact that large banks have the advantage of economies of scale to provide loans and advances; capacity to provide different types of loans and advance and being more accessible to the borrowers. Additionally, it could be due to large banks' capability to provide large amount of loan and advance to their customers on demand.

Nonperforming loans and advance's negative impact on loans and advances could be resulted from the fact that if the NPLA increased, the banks' credit risk would be increased. When credit risk increases, it could lead the bank to financial crisis. Additionally, NPLA has adverse effect on profitability. Therefore, the banks to reduce their credit risk and increase their profitability; they will critically review on their lending and focus on lending low risk loans. Consequently, their lending will be reduced.

The other significant variable was liquidity ratio, which measured by the ratio of liquid asset to total asset. The regression analysis resulted negative and significant effect of liquidity on loans and advance. The negative effect of liquidity on loans and advances could be due to the argument that most of commercial lending is the transformation of liquid assets to loans which are relatively illiquid. When loan disbursement increase, liquid assets will be converted in to loans which are relatively illiquid and consequently liquidity will be reduced.

Interest rate, which was represented by average lending interest rate of commercial banks, had statistically significant and positive effect on loans and advance. It was not in line with our expectation and this positive and significant effect of interest rate could be lenders sensitivity for changing of interest rate than borrowers. Therefore, when interest rate increases, the banks increases their disbursement of loans and advances and vice versa since the main revenue for commercial banks is interest income.

Unexpectedly, the effect of cash reserve requirement was positive and significant. It contradicts our expectation and the argument of inverse relationship. The argument for the inverse relationship was based on the fact that the higher the reserve requirement by the national bank, the lower the amount that can be provided as loan and advance to the borrowers.

5.2. Recommendations

This study was intended to identify the determinants of liquidity of Ethiopian private commercial banks; and hence on the basis of the findings of the study, the following recommendations were drawn

- Among bank-specific factors, nonperforming loan and advance had the major effect on private commercial banks' lending performance in Ethiopia. Therefore, the banks should work towards minimizing their nonperforming loans and advances to improve their lending performance through enhance and regular credit risk monitoring of their loan portfolios and loan defaults.
- The effect of interest rate was the most significant of all explanatory variables under this study. Therefore, the private commercial banks operating in Ethiopia should give due attention on the pricing of their loans and advance.
- In addition to internal environment, the private commercial banks should also consider the macroeconomic environment while developing their strategies and policies to utilize the opportunities and minimize the threats of the macroeconomic environment. Because the macroeconomic factors like interest rate has significant impact on their lending performance.

- Recommendation for further study: As this study identifies only limited bank specific and macroeconomic variables for a sample of eight private commercial banks in Ethiopia, there have to be further researches which include more bank specific variables, macroeconomic variables and regulatory factors that affect the lending performance of Ethiopian commercial banks.

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Appendices

APENDIX I: Model Regression Result

Dependent Variable: LOA
 Method: Panel EGLS (Cross-section random effects)
 Date: 05/28/17 Time: 12:20
 Sample: 2007 2016
 Periods included: 10
 Cross-sections included: 8
 Total panel (balanced) observations: 80
 Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.106443	1.955626	1.588464	0.1166
BS	0.668926	0.079115	8.455105	0.0000
DEP	-0.333657	0.388258	-0.859369	0.3930
NPLA	-10.31275	3.081637	-3.346518	0.0013
LIQ	-2.512147	0.504441	-4.980060	0.0000
CRR	8.283009	1.467266	5.645198	0.0000
IR	23.79694	11.16791	2.130832	0.0365
GDP	6.064436	5.356772	1.132107	0.2613

Effects Specification		S.D.	Rho
Cross-section random		0.153769	0.1997
Idiosyncratic random		0.307844	0.8003

Weighted Statistics			
R-squared	0.778147	Mean dependent var	11.35785
Adjusted R-squared	0.756578	S.D. dependent var	0.620041
S.E. of regression	0.305915	Sum squared resid	6.738025
F-statistic	36.07711	Durbin-Watson stat	1.384318
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.847313	Mean dependent var	21.23351
Sum squared resid	7.782477	Durbin-Watson stat	1.198535

Appendix II: White's test of heteroscedasticity

Heteroskedasticity Test: White

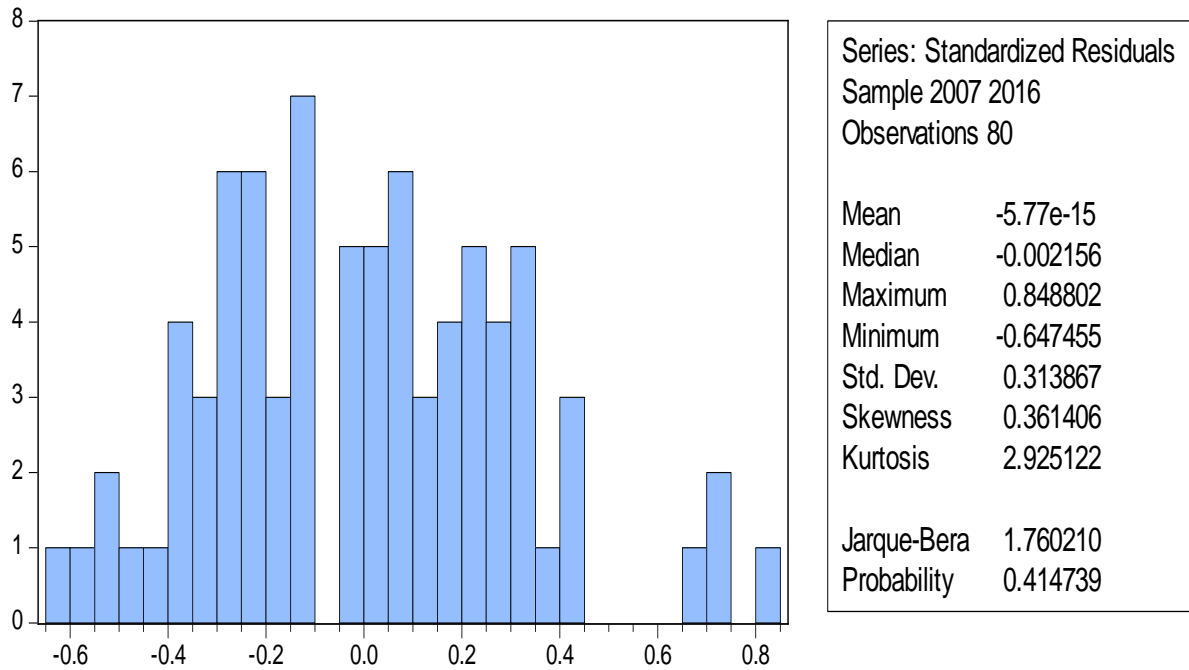
F-statistic	1.639804	Prob. F(34,45)	0.0601
Obs*R-squared	44.26918	Prob. Chi-Square(34)	0.1117
Scaled explained SS	37.27216	Prob. Chi-Square(34)	0.3209

Test Equation:
 Dependent Variable: RESID^2

Method: Least Squares
Date: 05/28/17 Time: 12:07
Sample: 1 80
Included observations: 80
Collinear test regressors dropped from specification

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	72.56916	41.31067	1.756669	0.0858
BS^2	0.040405	0.044386	0.910299	0.3675
BS*DEP	1.860257	1.270270	1.464459	0.1500
BS*NPLA	22.35639	7.773195	2.876087	0.0061
BS*LIQ	0.380215	0.519122	0.732420	0.4677
BS*CRR	-0.403356	1.106949	-0.364386	0.7173
BS*IR	-16.64774	10.07232	-1.652820	0.1053
BS*GDP	-5.026719	5.147683	-0.976501	0.3340
BS	-1.225278	2.609477	-0.469549	0.6409
DEP^2	-0.020836	1.767355	-0.011789	0.9906
DEP*NPLA	125.4984	72.03431	1.742203	0.0883
DEP*LIQ	5.598953	9.507075	0.588925	0.5589
DEP*CRR	-6.579968	22.87989	-0.287587	0.7750
DEP*IR	135.1450	186.1776	0.725893	0.4717
DEP*GDP	58.99746	65.73753	0.897470	0.3742
DEP	-67.49621	27.75820	-2.431577	0.0191
NPLA^2	242.1036	88.96413	2.721362	0.0092
NPLA*LIQ	82.57722	42.11966	1.960539	0.0561
NPLA*CRR	-22.64709	76.43744	-0.296283	0.7684
NPLA*IR	-1122.323	614.9461	-1.825075	0.0746
NPLA*GDP	-282.5799	469.5770	-0.601776	0.5503
NPLA	-487.8559	219.2554	-2.225058	0.0311
LIQ^2	-5.242523	2.798777	-1.873148	0.0676
LIQ*CRR	26.04993	13.60241	1.915097	0.0618
LIQ*IR	-196.3002	115.1766	-1.704341	0.0952
LIQ*GDP	-24.68971	74.35588	-0.332048	0.7414
LIQ	13.42673	20.55234	0.653294	0.5169
CRR^2	-238.9202	111.9071	-2.134987	0.0382
CRR*IR	-2829.599	958.8814	-2.950937	0.0050
CRR*GDP	-98.01929	246.8373	-0.397101	0.6932
CRR	400.8934	133.1609	3.010594	0.0043
IR^2	4656.424	2070.812	2.248599	0.0295
IR*GDP	4889.581	1779.885	2.747134	0.0086
IR	-907.9022	500.4772	-1.814073	0.0763
GDP^2	-2384.134	926.1491	-2.574244	0.0134
R-squared	0.553365	Mean dependent var		0.095308
Adjusted R-squared	0.215907	S.D. dependent var		0.138285
S.E. of regression	0.122450	Akaike info criterion		-1.062591
Sum squared resid	0.674731	Schwarz criterion		-0.020454
Log likelihood	77.50364	Hannan-Quinn criter.		-0.644769
F-statistic	1.639804	Durbin-Watson stat		1.858707
Prob(F-statistic)	0.060080			

Appendix III: Normality test for residuals



Appendix IV: Hausman Test, Random effect model vs. fixed effect model

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

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	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.
BS	0.513804	0.668926	0.009061	0.1032
DEP	-0.556238	-0.333657	0.020269	0.1180
NPLA	-9.870102	-10.312755	0.788015	0.6180
LIQ	-2.466114	-2.512147	0.004980	0.5142
CRR	6.472056	8.283009	1.163776	0.0932
IR	32.274900	23.796941	29.977476	0.1215
GDP	7.450585	6.064436	0.753680	0.1103

Cross-section random effects test equation:
 Dependent Variable: LOA
 Method: Panel Least Squares
 Date: 05/28/17 Time: 12:14

Sample: 2007 2016
 Periods included: 10
 Cross-sections included: 8
 Total panel (balanced) observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.821580	2.542471	2.289733	0.0253
BS	0.513804	0.123775	4.151108	0.0001
DEP	-0.556238	0.413538	-1.345071	0.1833
NPLA	-9.870102	3.206946	-3.077727	0.0031
LIQ	-2.466114	0.509354	-4.841655	0.0000
CRR	6.472056	1.821166	3.553797	0.0007
IR	32.27490	12.43783	2.594897	0.0117
GDP	7.450585	5.426664	1.372959	0.1745

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.879147	Mean dependent var	21.23351
Adjusted R-squared	0.853117	S.D. dependent var	0.803239
S.E. of regression	0.307844	Akaike info criterion	0.648912
Sum squared resid	6.159909	Schwarz criterion	1.095542
Log likelihood	-10.95650	Hannan-Quinn criter.	0.827979
F-statistic	33.77455	Durbin-Watson stat	1.530809
Prob(F-statistic)	0.000000		

Appendix V: Panel unit root test Stationarity

Panel unit root test: Summary

Series: D(LOA)

Date: 05/21/17 Time: 12:57

Sample: 2007 2016

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-8.66454	0.0000	8	62
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.26877	0.0000	8	62
ADF - Fisher Chi-square	51.7690	0.0000	8	62
PP - Fisher Chi-square	67.2193	0.0000	8	64

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Source: *NBE and own computation through Eviews 9*