



**DETERMINANTS OF NONPERFORMING LOANS: EMPIRICAL
STUDY OF COMMERCIAL
BANKS IN ETHIOPIA**

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Declaration

I, Yared Abebe, hereby declare that the thesis work entitled “Determinants of nonperforming loans and their impacts on financial performance-empirical study on commercial banks in Ethiopia” submitted by me for the award of the degree of Masters of Science in Accounting and Finance of Addis Ababa University at Addis, Ethiopia, is my original work and it has never been presented in any university. All sources and materials used for this thesis have been duly acknowledged.

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This is to certify that the thesis prepared by Yared Abebe, entitled: *Determinants of Non-performing loans: Empirical Study on Ethiopian commercial Banks* and submitted in partial fulfillment of the requirements for the Degree of Master of Science (Accounting and Finance) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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List of Acronym & Abbreviations

| | |
|--------|---|
| AIB: | Awash International Bank |
| ALR: | Average Lending Rate |
| BOA: | Bank of Abyssinia |
| BLUE: | Best Linear Unbiased Estimators |
| CAR: | Capital Adequacy Ratio |
| CBE: | Commercial Bank of Ethiopia |
| CEMAC: | Central African Economic and Monetary Community |
| CEEC: | Central Eastern European Countries |
| CESEE: | Central Eastern and South Eastern European |
| CIT: | Corporate Income Tax |
| CLRM: | Classical Linear Regression Model |
| CPI: | Consumer Price Index |
| CSA: | Center of Statistical Agency |
| DB: | Dashen Bank |
| DW: | Durbin–Watson |
| dL: | Durbin critical Lower value |
| dU: | Durbin critical Upper value |
| ETB: | Ethiopian Commercial Bank |
| ETR: | Effective Tax Rate |
| GDP: | Gross Domestic Product |
| IMF: | International Monetary Fund |
| INFR: | Inflation Rate |
| KYC: | Know Your Customer |
| LTD: | Loan to Deposit |
| MENA: | Middle East and North Africa |
| MoFED: | Ministry of Finance and Economic Development |
| NBE: | National Bank of Ethiopia |
| NIB: | Nib International Bank |
| NPL: | Nonperforming Loan |
| OLS: | Ordinary Least Square |

ROA: Returns on Asset
ROE: Return on Equity
UB: United Bank
US: United States
VIF: Variance Inflation Factors
WB: Wegagen Bank

ABSTRACT

This study examines the bank-specific and macro-economic determinants of Non-performing loans (NPLs) of commercial banks in Ethiopia. The study adopts a mixed methods research approach by combining documentary analysis (structured review of documents) and in-depth interviews. More specifically, the study reviews the financial records of seven commercial banks in Ethiopia and relevant data on macroeconomic factors considered for the period from the year 2007 to 2016. As noted by Sharon (2007), loans have a vital contribution towards development of economy. However, its nonpayment also leads to incidence of huge loss on banks in particular and country in general. Hence, this study was conducted to examine both banks specific (loan to deposit ratio, capital adequacy ratio, return on asset and return on equity) and macroeconomic (lending rate, inflation, gross domestic product and effective tax rate) determinants of NPLs of commercial banks in Ethiopia. To this end, the researcher has selected seven senior commercial banks in Ethiopia judgmentally. This study used unstructured interview and secondary sources of data, which is panel data in nature, over the period 2007-2016. These data were collected from NBE, MoFED and CSA. Furthermore, fixed effect model was used to examine the determinants of NPLs. This research is an explanatory research design that identifies the cause and effect relationships between the NPLs and its determinants. The finding revealed as Effective Tax Rate had positive but insignificant effect on NPLs of commercial banks in Ethiopia. However, bank profitability measured in terms of Return on Asset and Return on Equity and banks' capital adequacy ratio had negative and statistically significant effect whereas average lending rate, inflation rate and gross domestic product had positive and statistically significant effect on NPLs of commercial banks in Ethiopia. The finding of this study is significant since once identifying the determinants of NPLs might enable management body to make appropriate lending policies that prevent the occurrence of NPLs. Furthermore, the study recommended as bank managers should emphasize the management of current assets and loans than fixed assets in order to reduce the level of nonperforming loans. Besides, it is better for the loan officers to provide financial counseling to the borrowers on the wise use of loan and also to make decision on timely fashion to meet their need.

Key words: *Nonperforming loans, bank specific factors, macroeconomic factors*

CHAPTER ONE

INTRODUCTION

This chapter begins with discussing background of the study that gives some insight on the issues of nonperforming loans (NPLs). After giving some insight on the issues of NPLs, statement of the problem part that shows the direction of the study, justifies the reason to carry out this study. Following this, both general and specific objectives of the study, the research hypothesis those tested against the econometric results are presented. Lastly, the subsequent section presents significance of the Study of the study, scope and limitation of the study, and organization of the paper, ethical issues and operational definitions respectively.

1.1. Background of the Study

Banks can be defined as intermediaries between depositors and borrowers in an economy (Heffernan, 1996). Banks are one of the most important financial intermediaries whose primary function is to mobilize funds from surplus areas and pass them over (lend) to those who face shortages (deficit) (Sontakke and Tiwari, 2013). In other words, banks act as a bridge between those sections of society which save and those which seek to invest but do not have financial means to do so. Since deposits constitute the main source of bank's loanable funds, banks can be viewed as lenders which struggle to survive not only to survive but also grow on a slim margin between the interest they pay to the depositors and the interest they earn from the borrowers. This characteristic of banks serves to underline both the risk involved and the precaution needed.

Well-functioning banking sector accelerate economic growth, while poorly functioning banking sector is an obstruction to economic progress and aggravate poverty (Richard, 2011). Thus, economic growth in any country is not possible without a sound banking sector (Rajaraman and Visishtha, 2002).

Lending represents the heart of the banking industry. Loans are the dominant asset and represents 50-75 percent of the total amount at most banks, generates the largest share of operating income and represent the banks greater risk exposure (Mac Donald and Koch, 2006). Moreover, its contribution to the growth of any country is huge in that they are the main intermediaries between depositors and those in need of fund for their viable projects (creditors) thereby ensure that the money available in

economy is always put to good use. Therefore, managing loan in a proper way not only has positive effect on the banks performance but also on the borrower firms and a country as a whole. Failure to manage loans, which make up the largest share of bank assets, would likely lead to the episode of high level of non-performing loans (Sontakke and Tiwari, 2013).

Furthermore, the accumulations of non-performing loans (NPLs) create a problem, which is dealt with by making provision for them out of the profit earned (Wanjira - 2010). Recovery of such default requires effective legal system to realize the value of the collateral security pledged against the loan, which if concluded with loss erodes the profit and capital base of the bank. At the extreme case, when the value of non-performing loan becomes greater than the capital of the bank, the bank would be trapped with a serious liquidity problem that could be turned out to solvency problem, a situation where the bank would be unable to pay its liabilities in full and in time (Sinenhancing - 2010).

According to the International Monetary Fund (IMF, 2009), a non-performing loan is any loan in which interest and principal payments are more than 90 days overdue, or more than 90 days worth of interest has been refinanced.

On the other hand the Basel Committee¹ (2001) puts non-performing loans as loans left unpaid for a period of 90 days. Therefore, NPLs refer to those financial assets from which banks no longer receive interest or installment payments as scheduled. They are known as non-performing because the loan ceases to “perform” or generate income for the bank. According to National Bank of Ethiopia’s Directive No SBB/43/2008 ‘Asset Classification and Provisioning’ Directive, ‘Non-performing’ means loans or advances whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with contractual repayment terms of the loan or advances is due and uncollected for 90 (ninety) consecutive days or more beyond the scheduled payment date or maturity.

In the case of Ethiopia, banks, insurance companies and micro-finance institutions are the major financial institutions. The sector is closed for non-Ethiopian citizens. (National Bank of Ethiopia Directives, 2008). Proclamation No. 592/2008 (FDRE, 2008) does not permit foreigners to own and operate banks in Ethiopia. There is a relatively favorable environment for banking and other financial institutions in Ethiopia. As of January 30, 2017 the number of banks operating in

Ethiopia remained 18 of which 16 are private and the remaining two state-owned banks. These banks opened 226 new branches during the second quarter of 2016/17 thereby increasing the total number of bank branches to 3,609. Therefore, currently one branch serves 25,548.60 people on average. Of the total bank branches, about 35 percent are located in Addis Ababa. Private Banks accounted for about 64.1 percent of the total bank branches in the country. Total capital of the banking system reached Birr 47.4 billion in the second quarter of 2016/17, depicting 18 percent annual growth. Of the total capital of the banking system, private banks accounted for 50.4 percent while that of Commercial Bank of Ethiopia and development bank of Ethiopia stood at 33.6 percent and 16 percent respectively thereby putting the total capital share of the two public banks at 49.6 percent. Domestic trade was the largest beneficiary of the fresh loans accounting for 30.1 percent followed by industry (21.1 percent), housing and construction (14 percent), international trade (12.8 percent) transportation and communication (7.1 percent) and agriculture (6.7 percent). At the same time, the banking sector collected 22 billion in loans, 15.3 percent higher than last year same period. Of the total collection, 60 percent was by private banks and 40 percent by public banks. Total outstanding credit of the banking system (excluding credit to central government and interbank lending) increased to Birr 292.1 billion depicting a 31.5 percent growth over the last year same period. About 99.9 percent of the private banks and 47.7 percent of public banks loan went to finance the private sector (NBE, 2017, Quarterly Bulletin, 2016/17 Fiscal Year Series).

Commercial banks in Ethiopia provide credit facilities and services to various classes of customers. In the course of their operation, however, they may find themselves with a loan portfolio in which the risk of the loss is greater than they had anticipated when the loan was made. That is a position where the risk is greater than the bank would normally will to assume. During this time the loan portfolio will be dominated by non-performing loans. Non-performing Loans or bad loans arise in respect of the loans and advances which are given by banks to the whole range of different projects including but not exclusively retail or wholesale, personal or corporate or short, medium or long term projects. NPLs are, therefore, a very sensitive element of a bank's operations.

The health of commercial banks in Ethiopia often is measured by the National Bank of Ethiopia, among other things, by the amount of sick loans they have in their books. The regulatory agency forces the banks to put provision against these types of loans and in order to protect the public that deposit its savings with them. The non-performing loans are one of the major causes of the

economic stagnation problems and if the non-performing loans are kept existing and continuously rolled over, the resources may be locked up in unprofitable sectors; thus, hindering the economic growth and impairing the economic efficiency.

According to Rawlin et al. (2012), the principal aim of any business is to make profits. That is why any asset created in conduction of business should generate income for the business. Since this issue is applicable for the banking sector business, banks should give due consideration on the management of loans because lending is the main business of commercial banks and loan is normally the main assets and vital source of revenue for the commercial banks (Daniel and Wandera, 2013). Therefore, banks do grant loans and advances to individuals, business organizations as well as government in order to enable them operates on investment and development activities as a mean of contributing toward the economic development of a country in general and aiding their growth in particular.

According to lafuate; (2012) deterioration in asset quality is much more serious problem of bank unless the mechanism exists to ensure the timely recognition of the problem. It is a common cause of bank failure. Poor asset quality leads to nonperforming loan that can seriously damage a banks' financial position having an adverse effect on banks operation (Lafuente, 2012). Thus, given the unique features of banking sector and environment in which they operate and also rapid expansion of banking institutions in Ethiopia, there are strong wishes to conduct a separate study on the determinants of NPLs of banking sector in Ethiopia. Besides, inconsistent results in different studies among researchers are also another motive to conduct this study. To this end, the main objective of this study was to examine the bank specific and macroeconomic determinants of NPLs of commercial banks in Ethiopia. This initiates the bank management and executives with applied knowledge on the management of identified variables and provides them with understanding of activities that will enhance their loan quality and play a vital role in filling gap in understanding the determinants of NPLs.

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1.2. Statement of the Problem

Banks play very important roles in the economic development and growth of any nation (Sontakke and Tiwari, 2013). As an important component of the financial system, they channel scarce resources from the surplus economic units to the deficit economic units in the form of credit as such this activities form part of their existence (Iwedi & Onuegbu, 2014). In order to function their intermediary role, banks collect funds from savers in the form of deposit and then supply it to borrowers as loans, implying that deposit is a primary source for banks to make loans and advances (Sontakke and Tiwari, 2013).

The supply of bank loans is usually expressed as a function of internal and external determinants (Brownbridge, 1998). The internal determinants are termed as micro or bank-specific determinants of bank lending, while the external determinants are macroeconomic variables that are not related to bank management but reflect the monetary, economic and legal environment that affect the operation and performance of financial institutions (Shingjergji;2013).

Studies on bank lending behavior have noted that, bank-specific variables have a capacity to explain the behaviour of credit delivery (Kishan & Opiela, 2000; Kashyap and Stein, 2000; Gaiotti & Secchi, 2006). It includes factors like the size of the bank, the efficiency of the management, deposit volume, bank liquidity, bank capitalization level, bank growth etc. The macroeconomic factors include Gross Domestic Product (GDP), inflation rate, employment level, money supply and exchange rate etc.

In addition to the above factors, bank lending decision is also affected by the ownership structure of banks. Noth (2011) and Behr et al. (2013) show that the bank lending behavior is not uniform and it is various in terms of ownership structure of banks.

Privately owned commercial banks typically aim at profit maximization, while state owned banks tend to follow social welfare oriented objectives and deviate from strict profit maximization (Swamy ;2012). For instance, in Ethiopia according to the International Monetary Fund (IMF) report, 79 percent of lending was allocated to the public sector in fiscal year 2012/13 via Commercial Bank of Ethiopia (CBE) (IMF, 2013).

Issues of Nonperforming Loans (NPLs) gained increasing attentions in the past few decades. Poor loan management will contribute to NPLs (K Clementina - 2014). It is critical issue for every bank to manage bad loans. Many countries are suffering from Nonperforming Loans (NPLs) in which banks are unable to get profit out of loans (Petersson and Wadman, 2004).If the loan is well managed, it will increase the bank's profitability and sustainability in the future (Rasiah; 2010). However, if failed to do so, it will be the major threat to their survival (MacDonald, 2006).

NPLs affect the bank's liquidity and profitability which are the main components for the overall efficiency of the bank (Auronen; 2003). An increase in NPLs provision diminishes income. Again, mismatch of maturities between asset and liability create liquidity risk for the banks that deteriorate bank's overall credit rating including its image (Badar and Yasmin, 2013).Therefore, the determinants of NPLs should be given a due consideration because of its adverse effect on survival of banks.

The adverse effect of NPLs is attributable to bank managers' adverse selection of its borrowers (Brownbridge, 1998). NPLs are determined by different factors such as level of GDP, inflation , unemployment, volume of deposit, return on equity, return on asset, capital adequacy, total loan, liquidity, bank size, excessive lending, interest rate and credit growth. These factors are studied by different researchers in different countries (Mileris, 2012; Tomak, 2013; Ahmad and Bashir, 2013; Shingjerji, 2013.)

Though there are a number of studies that are conducted at a global level to examine the determinants of NPLs, most of the studies were made with reference to developed countries like Italy, Spain, Greece, Europe and USA. This means, they do not explain the issues for emerging market particularly for Ethiopian case.

Unpublished data from the NBE for the period December 12, 2012, shows that the industry average is below the set threshold. Despite this, ratio of non-performing loans for Commercial Bank of Ethiopia (CBE), Construction & Business Bank (CBB) and Development Bank of Ethiopia (DBE) stood at 1.10%, 3.62% and 9.46% respectively. On the other hand during the same period, privately owned commercial banks, such as Bank of Abyssinia (BOA), United Bank (UB) and Zemen Bank (ZB) maintained NPLs position of 6.47%, 4.65% and 13.8%. Additionally, banks that are relatively new and small during the same period as Abay Bank, Berhan International Bank recorded NPLs ratio of 4.07% and 5.47% respectively.

Thus, the prevalence of non-performing loans that literally exist in all banks and deviant observation caught the attention of the researcher for a thorough examination. The researcher, therefore, believes there are perhaps more important, causes that need to be addressed as the first order of banking business is to identify the real causes behind the unpaid loans in the banking system. From identification of problems and causes the study shall move on to the formulation of general proposals for solutions. These problems along with the knowledge gap in the literature calls for a research to investigate the causes for the actuality of high level of non-performing loans. This study tried to provide real information about the determinant factors affecting NPLs of commercial banks and feasible recommendation for the impact of identified variables on the levels of NPLs. Therefore, the researcher used panel data for the period 2007 to 2016 that obtained from NBE, MoFED and CSA.

1.3. Objectives of the Study

1.3.1. General Objective

The general objective of this study was to examine and investigate the determinants of NPLs in the commercial banks of Ethiopia.

1.3.2. Specific Objectives

Specific objectives of the study were;

1. To examine the bank specific determinants of nonperforming loans (NPLs) of commercial banks in Ethiopia.
2. To examine macroeconomic determinants of nonperforming loans (NPLs) of commercial banks in Ethiopia.
3. To examine the trends of nonperforming loans (NPLs) of commercial banks in Ethiopia.

1.4. Research Questions and Hypothesis

The general objective of this study is to investigate the determining factors of NPLs in Ethiopian commercial banking sector. Having this general objective, the following sections discuss the research questions and hypothesis that have been used for investigation purpose.

1.4.1 Research questions

In line with the broad objective highlighted above, the following two specific research questions were formulated:

RQ1. What are the determinants of banks' non-performing loans in Ethiopian commercial banking sector?

RQ2. What are specific and macroeconomic determinants of bank's nonperforming loans in Ethiopian commercial banks?

1.4.2 Research Hypothesis

The purpose of this study is to examine the determinants of nonperforming loans (NPLs) of commercial banks in Ethiopia. The empirical studies made around the world demonstrate various outcomes on determinants of nonperforming loans of the financial sectors. From the review of empirical literature, the researcher perceived as there is no consistency in the results for the determinants of nonperforming loans. For instance, From Ethiopian context, Wondimagegnehu (2012) on the title "Determinants of Nonperforming Loans of Banking sector in Ethiopia" found as interest rate has no impact on the levels of NPLs via OLS regression model. However, the study of Saba et al. (2012) on the title of "Determinants of Nonperforming Loan on US Banking sector" found negative significant effect of lending rate and positive significant effect of real GDP per capital and inflation rate on NPL via OLS regression model. Similarly, the study of Louzis et al.(2010) examined the determinants of NPLs in the Greek financial sector using dynamic panel data model and found as real GDP growth rate, ROA and ROE had negative whereas lending, unemployment and inflation rate had positive significant while loan to deposit ratio and capital adequacy ratio had insignificant effect on NPLs. However, Swamy (2012) examined the determinants of NPLs in the Indian banking sector using panel data and found as GDP growth rate, inflation, capital adequacy and bank lending rate have insignificant effect on NPLs. According to

Shingjergji (2013) and Boudriga et al. (2009) ROA has significant negative effect on NPLs whereas Makri et al. (2014) found as ROA did not show any significant impact on NPL ratio.

In this section the researcher developed testable hypotheses to examine the relationship between bank specific and macroeconomic determinants nonperforming loans of commercial banks in Ethiopia. Thus, based on reviewed related literatures, the researcher developed the following null hypotheses to estimate the sign relationship of bank specific and macroeconomic determinants with nonperforming loans of commercial banks in Ethiopia based on empirical evidence reviewed in the literature parts. Since, the null hypothesis is the statement or the statistical hypothesis that is actually being tested (Brooks, 2008),

The hypotheses of this study were formulated by referring the existing theories and past empirical studies that have been conducted on the determinants of bank's NPLs. The hypotheses of this particular study are intended to catch the determinants of NPLs quantitatively through structured review of documents. In line with the broad objective of the study the following seven hypotheses were formulated and tested.

H1. Return on asset (ROA) has negative relation with Nonperforming loans (NPLs) of banks.

H2. Return on equity (ROE) has negative relation with Nonperforming loans of commercial banks in Ethiopia.

H3. Loan to deposit ratio (LTD) has positive relation with Nonperforming loans banks.

H4. Capital adequacy ratio (CAR) has negative relation with Nonperforming loans (NPLs) of banks.

H5. Inflation rate (INF) has negative relation with Nonperforming loans (NPLs) banks.

H6. Lending rate (LR) has positive relation with Nonperforming loans (NPLs) of banks.

H7. Effective tax rate (ETR) has positive relation with Nonperforming loans (NPLs) banks.

1.5 Scope of the Study

This research paper mainly focuses on the determinants of NPLs of commercial banks in Ethiopia. Due to time and budget constraints the researcher decide to limit the scope of the study to the commercial Banks that are registered by National Bank of Ethiopia namely Commercial Bank of Ethiopia (CBE), Awash International Bank (AIB), Dashen Bank (DB), Bank of Abyssinia (BOA), Wegagen Bank (WB), United Bank (UB) and Nib International Bank (NIB) that were registered by NBE before 2006/07. These banks were selected since they are senior banks and were expected to have more experience on the lending activities. Besides, this study considers bank profitability

(ROA, and ROE), loan to deposit ratio, and capital adequacy ratio, lending rate, inflation rate, and effective tax rate for the decision and analysis of data. To this end, this study covers a panel data of these banks over the period 2006/07 to 2015/16.

1.6 Significance of the study

The issue of non-performing loans (NPLs) has gained increasing attentions in the last few decades. If loans and advances are not paid as and when due, credit risk is involved on reducing the value of the banks business. It must also be well understood that if loans and advances are properly controlled there should be no reason as to why borrowers fail to meet their contractual obligation on time. Hence in order to control and minimize the occurrences of bad loans every effort to utmost degree must be carried out by banks to identify the problems and real causes and move to the formulation of general proposals for solutions.

Researches indicate the immediate consequence of large amount of NPLs in the banking system is bank failure. Many researches on the cause of bank failures find that asset quality is a statistically significant predictor of insolvency (e.g. Dermirgue-Kunt 1989, Barr and Siems 1994), and that failing banking institutions always have high level of non-performing loans prior to failure. Therefore, as first order of banking business, identification of determinants of non-performing loans assist banks to employ sound credit appraisal and management system to provide judicious and effective credit services to achieve their overall objectives.

Furthermore, the finding of this study would help Ethiopian banks get insight on what it takes to improve their loan qualities and the central bank (NBE) to examine its policy in banking supervision pertaining to ensuring asset quality banks maintain. Furthermore, the study would also contribute to the existing body of knowledge regarding the determinants of non-performing loans and motivates further research on the subject.

1.7 Limitations of the Study

The first limitation of the study was due to a complex exercise owing to confidentiality policy of the banking business secrets, access to customer and banks complete and reliable information in connection with bad debts, except officially disclosed financial information. The study also limited to bank employees' and officials' personal perception and officially disclose financial data of banks. Finally, resource and time constraints were also some of the factors that hindered the outcome of the research.

But most of the required data is available in the national bank of Ethiopia and the researcher was requested formally these data and found all the necessary data properly.

1.8 Definition of operational terms

Bank specific factors: are variables that are under the control of bank management. They can be directly/ indirectly stated in the financial statements of banks.

Borrower: the one who borrows money from the lender (Bank).

Credit risk: the risk arises as result when the borrower fails to conclude its financial contract according to the agreement with lender. It is an asset default by counter party.`

Lending: provision of loan by one party (lender) to another party (Borrower)

Loan and advances: any financial asset granted by banks to borrower on a contract of an obligation to repay the principal amount with usually its interest either on due date or demand

Macroeconomic factors: are variables in which the bank management has no power to control them. Rather, these variables are related with the fiscal and monetary policies of the country.

Nonperforming loans: a loan whose credit quality has deteriorated and the full collection of principal and/or interest as per the contractual repayment terms of the loan/advances is in question and delayed for more than 90 days(NBE, 2008).

1.9 Structure of the Paper

This thesis is organized into five chapters. The first chapter starts with presenting background of the study, statement of the problem, objective of the study, significance of the study, scope and limitation of the study. The second chapter focuses on both theoretical and empirical review of related literature and conceptual frame work are identified. Chapter three contained research methodology where research design, research approach, population, sampling method, sample size, sources of data, instruments, data analysis technique, model specification, variable definition and hypothesis development were covered. Chapter four focused on the results and discussion in which the findings results that are interpreted. Finally, Chapter five brought to an end the research with summary, conclusion and possible recommendation.

CHAPTER TWO

RELATED LITERATURE REVIEW

This chapter starts with presenting the overview of banking system in Ethiopia. Besides, bank loans including its determinant factors were presented. Furthermore, concepts relating to nonperforming loans are discussed. Following this, empirical studies (cross countries and single country) are reviewed by focusing on determinants of NPLs are presented. Then after, the knowledge gaps from the reviewed literatures are outlined.

2.1. Overview of Bank Loans and Lending

Commercial bank is a depository institution that is relatively unrestricted in its ability to make commercial loan and that is largely permitted to issue checking accounts. Commercial banks are the most important of all depository institution (Leroy and Vanhoos, 2006). They create money by through lending and purchasing securities (Thomas, 2006). Commercial banks extend credit to different types of borrowers for many different purposes.

One of the major functions of any commercial bank is providing loan to the business society. Banks collect money from those who have excess money and lend it to others who need money for different purpose. Therefore, banks' intermediary function plays a vital role in the economic activity. Banks accept customer deposits and use those funds to give loans to other customers or invest in other assets that will yield a return higher than the amount bank pays the depositor (McCarthy et al., 2010 cited in Zewdu, 2010). It follows that customers' deposit is the primary source of bank loan and hence, increasing or guaranteeing deposits directly has a positive effect on lending. Therefore, bank credit is the primary source of available debt financing for most customers whereas good loans are the most profitable assets for banks.

The principal profit making activity of commercial banks is making loans to its customers. In the allocation of funds to earn the loan portfolio, the primary objective of bank management is to earn income while serving the credit needs of its community (Reed and Gill, 1989 cited in Zewdu, 2010). Therefore, like all debt instruments, a loan entails the redistribution of financial assets over time, between the lender and the borrower. The borrower initially receives an amount of money from the lender to pay back, but sometimes not always in regular installments, to the lender. This service is generally provided at a cost, known as interest on the debt. As one of the principal duties of

financial institutions is to provide loans, it is typically the main source of income to banks. Besides, bank loans and credit also constitute one of the ways of increasing money supply in the economy (Felix and Claudine, 2008).

Loans are the largest single source of income for banks. Bank loan involves personal relationships between the bankers and borrowers. It has a highest degree of default risk than other bank assets. Loans yield the higher rate of return among bank assets in compensation for lower liquidity and higher risk (Thomas, 2006). A loan composition greatly varies among banks based on their size, location, trade area and lending experts (MacDonald, 2006).

According to Zewdu (2010), 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.

Lending represents the heart of the industry and Loans are the dominant asset and represent 50- 75 percent to total amount at most banks, generate the largest share of operating income and represents the bank's greatest risk exposure (MacDonald, 2006).

2.2 Factors that influence Bank Loans

Since lending is the principal function of banking industry, the management of banks should give due attention, analyze and take the necessary measures on time on internal and external factors that affect or limit lending. Without lending, banks' incomes especially interest income would highly deteriorate and affect bank survival. In case, since nonperforming loans (NPLs) has a direct reflection of poor asset quality, the factors that influence banks loans have their own impact on NPLs (Rawlin *et al.* 2012).

According to Reed and Gill (1989) the following sources may be affected by different factors and would have a direct influence on lending. Therefore, the factors that influence bank loans, that might have their own impact on NPLs are:

Ability and experience of bank personnel: The expertise of lending personnel is not insignificant in the establishment of bank loan policy. One of the probable reasons that banks were slow in entering the consumer lending field was the lack of skilled personnel.

Capital position: The capital of banks serves as a custom for protection of depositors' funds. The size of capital in relation to deposits influences the amount of risk that a bank can afford. Relatively large capital structure can make loans of longer maturities and greater credit risk.

Credit needs of the area served: banks specialized experience on different types of loans e.g. Mortgage real-estate. The major reasons banks are chartered is to serve the credit needs of their communities. Banks are morally bound to extend credit to borrowers who present logical and economically sound loan requests. According to Black and Daniel (1989) cited in Zewdu (2010) there are also other factors that affect bank lending and investing activities. These factors include:

Economic conditions: Stable economy is more conducive to a liberal loan policy than the one that is subject to seasonal and cyclical movements. Deposit of famine economies fluctuate more violently than deposit in an economy noted for its stability. Consideration must be given to the national economy. Factors adversely affect the nation as a whole may, if they are of serious magnitude, eventually affect local conditions.

Influence of monetary and fiscal policies: If monetary and fiscal policies are expansive and additional, reserves are made available to the commercial banking system; the lending ability of banks is increased. Under these policies banks can have a more liberal loan policy.

Profitability: Some banks may emphasize earning more than others. Banks with greater need of earning might adapt more aggressive lending policies. An aggressive policy might call consumer loans, which normally are made at higher rates of interest than short-term loans.

Stability of deposits: The fluctuation and type of deposit must be considered. After adequate provisions have been made for reserves, bank can then engage in lending. Even though, these reserves designed to take care of predictable deposit fluctuations and loan demands since unpredictable demand force banks to give consideration to the stability of deposits in formulating loan policy.

The interest rate: represents rate of returns available from the various alternative lending and investing activities. Fundamental problem of bank management is achieving the proper balance between return and risk.

The liquidity of fund: it is the amount of liquid funds tied up in various lending and investing activities. To maintain adequate liquidity, bank must constantly guard against excessive losses from

lending and investing activities. If bank made too many bad loans, the value of its asset could fall below the amount of its liabilities.

Tax: corporate income tax rate affect the bank loans in different aspects: one is that high tax burden enable the banks to shift the tax burden either by increasing lending rate and fees or paying low interest rate on deposits. The second aspect is that, corporate income tax rate has output and input substitution effect. The output substitution effect states that increased CIT rate represents a decrease in production in the incorporated sectors. In this case, the demand for loan gets lower whereas input substitution effect represents the substitution of equity with other inputs for instance; debt (Albertazzi and Gambacorta, 2006). Taxation in banking sectors represents the ability of banks to allocate its portfolios reduces its taxes. Bank is capable of transferring the tax costs to its customers by raising fees and interest spreads. The shifting of tax burden to customers through higher lending rate on loan and lowering interest rate on the deposit has a direct impact on the level of NPLs (Khan *et al.* 2011). Besides, corporate entities shift their tax burden to other tax payers due to the existence of double taxation (Kaplow, 2008).

2.3 The Nature of Non-performing Loans

Over the last few years the literature that examines non-performing loans has expanded in line with the interest afforded to understanding the factors responsible for financial vulnerability. This situation may be attributed to the fact that impaired assets plays a critical role in financial vulnerability as evidenced by the strong association between NPLs and banking/financial crises in Argentina, East Asia and Sub-Saharan African Countries during the 1990s.

The key motivation for this paper is to improve understanding of the determinants of non-performing loans. However a lot of research papers can be found regarding the problem or non-performing loan. Many prudential researchers intend to work on NPLs because it is perceived as the foremost aspect of bank's survival.

The question of loan default is related with (none) recovery/repayment of loans. When a borrower cannot repay interest and/or installment on a loan after it has become due, then it is qualified as default loan or non-performing loan (Chowdhury & Adhikary, 2002). It is known as non-performing, because the loan ceases to “perform” or generate income for the bank. The default/non-performing loan is not a “uniclass”, rather a “multiclass” concept. It implies that the Default/non-

performing loans can be classified into five different groups usually based on the “Length of overdue” of the said loan.

The issue of nonperforming loans has gained increasing attentions in the last few decades. The immediate consequence of large amount of NPLs in the banking system is bank failure. Many researchers on the cause of banking failure find that asset quality is a statistically significant predictor of insolvency [e.g Dermirguc-kunt 1989, Barr and Siems 1994], and that failing banking institutions always have high level of nonperforming loans prior to failure.

The concept of NPLs has been defined in different literatures. According to Patersson and Wasman (2004), NPLs are defined as defaulted loans which banks are unable to profit from. They are loans which cannot be recovered within stipulated time that is governed by the laws of a country. According to the International Monetary Fund (IMF, 2009), a NPL loan is any loan in which interest and principal payments are more than 90 days overdue; or more than 90 days’ worth of interest has been refinanced.

NPLs generally refer to loans which for a relatively long period of time do not generate income. That is the principal and/or interest on these loans has been left unpaid for at least 90 days (Fofac, 2009). NPLs are further defined as loans, whose flows stream is so uncertain that the bank does not recognize income until cash is received, and loans those whose interest rate has been lowered on the maturity increase because of problem with borrower (Machiraju, Undated).

Keeton and Morris (1987) present one of the earliest studies to examine the causes of loan losses. In the latter paper the authors examined the losses by 2,470 insured commercial banks in the United States (US) over the 1979-85. Using NPLs net of charge-offs as the primary measure of loan losses Keeton and Morris (1987) shows that local economic conditions along with the poor performance of certain sectors explain the variation in loan losses recorded by the banks. The study also reports that commercial banks with greater risk appetite tend to record higher losses.

Several studies which followed the publication of Keeton and Morris (1987) have since proposed similar and other explanations for problem loans in the US. Sinkey and Greenwalt (1991), for instance, investigate the loan loss-experience of large commercial banks in the US; they argue that both internal and external factors explain the loan-loss rate (defined as net loan charge offs plus NPLs divided by total loans plus net charge-offs) of these banks. These authors find a significant

positive relationship between the loan-loss rate and internal factors such as high interest rates, excessive lending, and volatile funds. Similar to the previous study, Sinkey and Greenwalt (1991) report that depressed regional economic conditions also explain the loss-rate of the commercial banks. The study employs a simple log-linear regression model and data of large commercial banks in the United States from 1984 to 1987.

Keeton (1999) uses data from 1982 to 1996 and a vector autoregression model to analyse the impact of credit growth and loan delinquencies in the US. It reports evidence of a strong relationship between credit growth and impaired assets. Specifically, Keeton (1999) shows that rapid credit growth, which was associated with lower credit standards, contributed to higher loan losses in certain states in US. In this study loan delinquency was defined as loans which are overdue for more than 90 days or does not accrue interest.

Studies that examined other financial systems also provide similar results to those in the US. For instance, Bercoff et al (2002) examine the fragility of the Argentinean Banking system over the 1993-1996 period; they argue that NPLs are affected by both bank specific factors and macroeconomic factors. To separate the impact of bank specific and macroeconomic factors, the authors employ survival analysis.

Using a dynamic model and a panel dataset covering the period 1985-1997 to investigate the determinants of problem loans of Spanish commercial and saving banks, Salas and Saurina (2002) reveal that real growth in GDP, rapid credit expansion, bank size, capital ratio and market power explain variation in NPLs. Furthermore, Jimenez and Saurina (2005) examine the Spanish banking sector from 1984 to 2003; they provide evidence that NPLs are determined by GDP growth, high real interest rates and lenient credit terms. This study attributes the latter to disaster myopia, herd behaviour and agency problems that may entice bank managers to lend excessively during boom periods.

Meanwhile, Rajan and Dhal (2003) utilise panel regression analysis to report that favourable macroeconomic conditions (measured by GDP growth) and financial factors such as maturity, cost and terms of credit, banks size, and credit orientation impact significantly on the NPLs of commercial banks in India.

Using a pseudo panel-based model for several Sub-Saharan African countries, Fofack (2005) finds evidence that economic growth, real exchange rate appreciation, the real interest rate, net interest margins, and inter-bank loans are significant determinants of NPLs in these countries. The author attributes the strong association between the macroeconomic factors and non-performing loans to the undiversified nature of some African economies.

More recently Hu et al (2006) analyse the relationship between NPLs and ownership structure of commercial banks in Taiwan with a panel dataset covering the period 1996-1999. The study shows that banks with higher government ownership recorded lower non-performing loans. Hu et al (2006) also show that bank size is negatively related to NPLs while diversification may not be a determinant.

It is argued that the nonperforming loans are one of the major causes of the economics unproductively problems (Skarica; 2013). Non-performing loans can lead to efficiency problem for banking sector (Altunbas et al. 2000). It is found by a number of economists that failing banks tend to be located far from the most efficient frontier, because banks don't optimize their portfolio decisions by lending less than demand (C Msigwa - 2013). What's more, there are evidences that even among banks that do not fail; there is a negative relationship between the non-performing loans and performance efficiency (MZA Karim - 2010).

HR Machiraju expresses NPLs as a leading indicator of credit quality. NPLs or bad loans arise in respect of the loans and advances which are given by banks to the whole range of different projects including but not exclusively retail or wholesale, personal or corporate or short, medium or long term projects. NPLs are very sensitive elements of a bank's operations.

According to Brown, Mallett and Taylor, the losses bad loans (NPLs) cause, by reducing the capital resource of the bank, affects its ability to grow and develop its business (Taylor,1993). Disclosure of the extent of these losses in its financial statements may lead to a loss of confidence in the bank's management and a reduction in its credit ratings. This will in turn increase the bank's cost of borrowing in the wholesale market and make it more expensive or more difficult to raise capital. In extreme cases, it can leads to a loss of deposits, the withdrawal of the bank's authorization and ultimately insolvency (Taylor, 1993). Thus NPL is one of the concrete embodiments of credit risk

which banks take. They have greater implication on the function of the banks as well as the overall financial sector development.

Historically, the occurrence of banking crises has often been associated with a massive accumulation of non-performing loans which can account for a sizable share of total assets of insolvent banks and financial institutions, especially during episodes of systemic crises. Deterioration in banks' loan quality is one of the major causes of financial fragility. Past experience shows that a rapid buildup of bad loans plays a crucial role in banking crises (Demirgüç Kunt and Detragiache, 1998, and González Hermosillo, 1999). It is apparent that insolvency of banks is costly to the macro economy as such, but this cost can be increased or decreased by the regulators and the policies they use in resolving the insolvencies. The faster banks can be resolved before their economic capital turns negative, the smaller are both losses to depositors and costs to the macro economy (Kaufman, 2004). This is why most countries provide their own rules regarding NPLs and its classifications.

Under the Ethiopian banking business directive, non-performing loans are defined as “loans or 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 or advances in question (NBE, 2008).” It further provides that:

....loans or advances with pre-established repayment programs are nonperforming when principal and/ or interest is due and uncollected for 90 (ninety) consecutive days or more beyond the scheduled payment date or maturity (NBE, 2008).

In addition to the aforementioned category of non- performing loans, overdrafts and loans or advances that do not have pre-established repayment program shall be non-performing when:

The debt remains outstanding for 90 (ninety) consecutive days or more beyond the scheduled payment date or maturity;

The debt exceeds the borrower's approved limit for 90 (ninety) consecutive days or more;

Interest is due and uncollected for 90 (ninety) consecutive days and more; or for the overdrafts,

- (i) The account has been inactive for 90 (ninety) consecutive days or
- (ii) Deposits are insufficient to cover the interest capitalized during 90 (ninety) consecutive days or
- (iii) The account fails to show the 20% of approved limit or less debit balance at least once over 360 days preceding the date of loan review.

This is in accordance with the Basel rules. If a loan is past due for 90 consecutive days, it will be regarded as non-performing. The criteria used in Ethiopian banking business to identify NPLs is a quantitative criteria based on the number of days passed from loan being due.

According to NBE (2012) directive, Ethiopian commercial banks are required to classify their loans as pass, special mention, substandard, doubtful and loss in accordance with Bank for International Settlements (BIS)3 standards as presented below:

Pass: loans in this category are fully protected by the current financial and paying capacity of the borrower and not subject to any criticism.

Special mention: Short term loans past due for 30 days or more, but less than 90 days and medium and long term loans past due for 6 month or more, but less than 12 months.

Substandard: Short term loan past due for 90 days or more, but less than 280 days and medium and long term loans past due for 12 months or more, but less than 18 months

Doubtful: Short term loan past due for 280 days or more, but less than 360 days and medium and long term loans past due for 18 months or more, but less than 3 years.

Loss: Short term loan past due for 360 days or more, and Medium and long term loans past due for 3 years or more.

According to NBE (2012) directive, all Ethiopian commercial banks required holding provisions for each loans mentioned above so as to absorb the potential losses in their loans portfolio. The minimum provision requirements are mentioned below:

Table 2.1 Minimum Provision Requirement

| Classification of loans | Minimum percentage |
|--------------------------------|---------------------------|
| pass | 1% |
| Special mention | 3% |
| Substandard | 20% |
| Doubtful | 65% |
| loss | 100% |

Source: NBE (2012)

Among the above classified loans, the last three loans such as, substandard, doubtful and loss are considered as NPLs (NBE, 2012).

2.3.1 Determinants of Non-performing Loans

Unfortunately, there is no particular theoretical framework that emphasizes on the determinants of NPLs (Issa, 2009). However, with the major contribution of Akerlof (1971), the asymmetric information as concepts has been used to analyze the individual behavior in the market in relation to having knowledge in transactions or exchanges. These concepts can be extended to NPLs, since; NPLs are the result of a particular behavioural pattern emerging from moral hazard on the side of borrower and adverse selection on the side of lenders (Issa, 2009). Therefore, the concepts of asymmetric information can be examined to give further meaning and to understand behavioural aspects of NPLs.

According to Arestis and Sawyer (2001), the first important theoretical concept in relation to NPLs, as the articulation of asymmetric information, is the adverse selection issue. Adverse selection problem occurs before the transaction takes place, in the event that the lender's inability to distinguish between a high-risk borrower and a low-risk borrower is compromised. In this regard, Hafer (2005) noted that, increasing the interest rate and required additional collateral lead the low risky clients to go elsewhere in order to obtain loans, while the high risky clients will accept the conditions at hand. In other word, those who want to take on big risks are likely to be the most eager to take out a loan, even at a high rate of interest, because they are less concerned with paying the loan back.

As noted in Breuer (2006) conflict of interest between bank managers and shareholders may aggravate the adverse selection. Bank managers have short term decision horizons because their reputations are strongly influenced by public perceptions of their performance, as evidenced by short term earnings. Managers' reputations suffer if they fail to expand credit when the economy is expanding and bank earnings are improving. This herd behavior will result in some loans going to customers with higher default risk. In addition, the macroeconomic condition may also aggravate the adverse selection. During the expansion phase of the economy banks characterized by a relatively low number of NPLs, as both consumers and firms face a sufficient stream of income and revenues to service their debts. However as the booming period continues, credit is extended to lower quality debtors and subsequently, when the recession phase sets in, NPLs increase (Fisher 1933; Minsky 1986; Kiyotaki and Moore, 1997; Geanakoplos, 2009).

According to Arestis and Sawyer (2001), the second theoretical concept derived from asymmetric information is 'moral hazard', which can be applied to NPLs. A borrower may have incentives to misallocate funds for personal use and to undertake investment in unprofitable projects that serve only to increase their personal power or stature. Thus, a lender is subjected to the hazard that the borrower has incentives to engage in activities that are undesirable from the lender's point of view: that is, activities that make it less likely that the loan will be paid back. In addition, banks credit managers may intentionally provide loans to lower quality debtors.

Ultimately, it could be concluded that asymmetric information often leads to the emergence of the economic and financial problems especially NPLs in the credit market. Therefore, it can be said that the economic and commercial banks will not operate as efficiently as they should, in the absence of sufficient information, related to both clients and the general environment. Hence, by having theory of asymmetric information as standing point the following sections discussed the determinants of NPLs that are intended to cover under this study. It should be noted that all the determinants of NPLs that are discussed in the following sections do not necessarily have a direct relationships with theory of asymmetric information. Credit is extended to lower quality debtors and subsequently, when the recession phase sets in, NPLs increase (Fisher, 1933; Minsky, 1986; Kiyotaki and Moore, 1997; Geanakoplos, 2009).

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Finally, it could be concluded that asymmetric information often leads to the emergence of the economic and financial problems especially NPLs in the credit market. Therefore, it can be said that the economic and commercial banks will not operate as efficiently as they should, in the absence of sufficient information, related to both clients and the general environment. Hence, by having theory of asymmetric information as standing point the following sections discussed the deterrents of NPLs that are intended to cover under this study. It should be noted that all the determinants of NPLs that are discussed in the following sections do not necessarily have a direct relationships with theory of asymmetric information.

2.3.1.1 Bank Specific Factors

Bank specific factors or internal factors are the individual bank characteristics, which affect bank performance. These factors are influenced by the internal decisions of management and board. These factors are also within the scope of the bank to manipulate them and they differ from bank to bank. These include capital, size of deposit liabilities, size, and composition of credit portfolio, interest rate policy, labor productivity, and state of information technology, risk level management quality, bank size, and ownership among others (Dang, 2011). To proxy bank specific factors scholars often use CAMEL framework. CAMEL stands for capital adequacy, asset quality, management efficiency, earnings ability, and liquidity (Muluaem, 2015). Hence, the following part of this particular section clearly presents the bank-specific variables that are used in this study.

Return on Asset (ROA):-The return on assets ratio, often called the return on total assets, is a profitability ratio that measures the net income produced by total assets during a period by comparing net income to the average total assets. In other words, the return on assets ratio or ROA measures how efficiently the bank can manage its assets to produce profits during a period. Since the bank assets' sole purpose is to generate revenues and produce profits, this ratio helps both management and investors see how well the bank can convert its investments in assets into profits.

Therefore the return on assets ratio measures how effectively the bank can earn a return on its investment in assets. In other words, ROA shows how efficiently the bank can convert the money used to purchase assets into net income or profits. Thus, if the ratio of ROA is high, it indicates that it is better performance in order to generate profit. Strong bank profitability measured in terms of ROA might result from high lending rate, fees and commission that lead bank growth in size and profitability. Thus, ROA gives an idea as to how efficient management is at using its assets to generate earnings. Different researchers found different results regarding the relationship between ROA and NPLs. For instance: - Ahmed and Bashir (2013) and Makri et al.(2014,) were examined positive significant relationships between ROA and NPLs. However, Boudriga et a., (2009) and Selma and Jouini (2013) found negative association between NPLs and ROA by supporting the arguments that states deterioration of profitability ratio measured in terms of ROA leads to riskier activities of banks and then raise the level of NPLs. It is measured by the ratio of net profit to total asset as follows;

$$ROA = \frac{\text{Net profit}}{\text{Total Asset}}$$

Return on equity (ROE): is a measure of profitability that calculates how many birr of profit the bank generates with each dollar of shareholders' equity.ROE is more than a measure of profit; it's a measure of efficiency. A rising ROE suggests that the bank is increasing its ability to generate profit without needing as much capital. It also indicates how well the bank's management is deploying the shareholders' capital. Thus, ROE measures how much the bank is earning on their equity investment.

Many researchers were found different results between NPLs and bank profitability measured in terms of ROE. For instance: Shigjerji (2013) and Ahmed and Bashir (2013) and Makri et al.(2014)found negative relationships between ROE and NPLs. Therefore, this ratio is expected to have negative relationships with NPLs. It is measured by the ratio of net profit to total equity.

$$ROE = \frac{\text{Net profit}}{\text{Total equity}}$$

Capital adequacy ratio (CAR): is a measure of the amount of a bank's capital expressed as a percentage of its risk weighted credit exposures. An international standard which recommends minimum capital adequacy ratios has been developed to ensure banks can absorb a reasonable level of losses before becoming insolvent. Applying minimum capital adequacy ratios serves to protect depositors and promote the stability and efficiency of the financial system. It is a measure of banks

solvency and ability to absorb risk. Thus, this ratio is used to protect depositors and promote stability and efficiency of financial systems. According to Makri *et al.*(2014), there is negative relationship with NPLs indicating a risky loan portfolio is marked by a high NPL (equivalent to high credit risk). However, Djogap and Ngomsi (2012) found positive association between NPLs and capital adequacy ratio. It is measured by total Equity to total asset ratio. However, it is expected to have negative association with NPLs in this study. This implies that well capitalized banks are less incentive to take risk.

$$CAR = \frac{\text{Total Equity}}{\text{Total Asset}}$$

Loan to deposit (LTD) Ratio: a ratio that is used in determining the amount of loans that a bank has utilize the amount of current deposits on hand at that same time. This ratio is determined by dividing the bank's loan amounts by its total amount of deposits. This ratio also measures customer friendliness of banks implies that relatively more customer friendly bank is most likely face lower defaults as the borrower will have the expectation of turning to bank for the financial requirements (Ranjan and Chandra, 2003). Thus, it represents a bank's preference for credit. It is credit culture that represents a bank's preference for credit. It is measured in terms of loan to deposit ratio. There is empirical evidence that shows as LTD ratio has significant effect on the level of NPLs of banking sectors in different aspects. In this study, this ratio is expected to have positive relation with NPLs.

$$LTD = \frac{\text{Total Credit}}{\text{Total Deposit}}$$

2.3.1.2 Macroeconomic factors

The existing literature provides evidence that suggests a strong association between NPLs and macroeconomic factors. Several macroeconomic factors which the literature proposes as important determinants of NPLs are: real GDP growth, inflation rate, effective exchange rate, real interest rate, unemployment rate, broad money supply (M2) and GDP per capital (Salas and Suarina, 2002; Fofack, 2005; Jimenez and Saurina, 2005). This study considers the following macroeconomic factors for the purpose of investigating the relationship with NPLs.

Effective tax rate: is the rate which would be paid by a taxpayer on his tax if it was charged at a constant rate rather than progressive. i.e. the effective tax rate is the average rate at which the bank is taxed on the earned income.

Taxation in banking sectors represents the ability of banks to allocate its portfolios for its taxes. Corporate income tax rate affect the bank loans in different aspects. High tax burden enable the banks to shift the tax burden either by increasing lending rate and fees or paying low interest rate on deposits (Albertazzi and Gambacorta, 2006). Thus, bank is capable of transferring the tax costs to its customers by raising fees and interest spreads (Khan *et al.*, 2011). Bank with high debt pay less taxes due to higher interest expense. Accordingly, even if there is no specific study conducted using taxation as a determinant factor of NPLs, this study expects positive relationships between tax rate and NPLs. It is calculated as the total tax paid divided by the taxable income.

$$\text{Effective Tax Rate} = \frac{\text{Total Tax Paid}}{\text{Taxable Income}}$$

Inflation rate: is a measure of how fast a currency loss its value. That is, the inflation rate measuers how fast prices for goods andservices rise over time, or how much less one unit of currenc y buys now compared to one unit of currency at a given time in the past (Farhan et al.(2012). The inflation rate may increase due to massive printing of money, which increases supply in theecon omy and thus reduces demand. Equally, it may occur because certain important commodities become rarer and thus more expensive. Inflation is a sustained increase in the general level of prices for goods and services in a county, and is measured as an annual percentage change. Under conditions of inflation, the prices of things rise over time. Put differently, as inflation rises, every dollar you own buys a smaller percentage of a good or service. When prices rise, and alternatively when the value of money falls you have inflation. This indicates that, as inflation increase, the cost of borrowing gets more expensive and deteriorates the quality of loan portfolio.

According to Farhan *et al.* (2012); Skarica, (2013); Klein, (2013) and Tomak, (2013) there is a positive relationship between NPLs and Inflation rate. Theoretically, inflation should reduce the real value of debt and hence make lending easier. However, high inflation may pass through to nominal interest rates, reducing borrowers' capacity to repay their debt. Through its attraction with the tax system, it can increase tax burden by artificially increasing income and profits.

Besides, inflation cause firms to increase their costs of changing prices. Finally, it made individuals to hold less cash and make more trips to banks since inflation lowers the real value of money holdings. It can negatively affect the borrowers' real income when wages are stick.

Lending Rate/Interest Rate

It is the cost of borrowed funds .Interest rates rise in times of inflation, greater demand for credit, tight money supply, or due to higher reserve requirements for banks. A rise in interest rates for any reason tends to dampen business activity (because credit becomes more expensive) and the stock market (because investors can get better returns from bank deposits or newly issued bonds than from buying shares). Interest rate spread affect performing assets in banks as it increases the cost of loans charged on the borrowers (Joseph, 2011). Interest rate is the price a borrower pays for the use of money they borrowed from the lenders. Interest can be thought of as rent of money relationship with NPLs and lending rate since an increase in interest rate curtails the paying capacity of the borrowers. Thus, lending rate is a rate of return usually remains in admittance of monetary regulators (NBE) to manipulate the pursuance of monetary objectives. In case, maximum and minimum lending rate is set by NBE.

Farhan *et al.* (2012) and Ranjan and Chandra (2003) found as there is a positive relationship with NPLs and lending rate since an increase in interest rate curtails the paying capacity of the borrowers. Thus, lending rate is expected to have positive association with NPLs in this study. Accordingly, this study considers average lending rate (average of Minimum and Maximum Lending Rate) as proxy of lending rate as being commonly used by commercial banks for pricing loans. Whereas Saba *et al.* (2012) found negative association between lending rate and NPLs.

Real GDP Growth: there is an inverse relationship between GDP growth and the level of NPLs reported by commercial banks (Salas and Suarina, 2002; Jajan and Dhal, 2003; Fofack, 2005; Hou, 2006; Jimenez and Saurina, 2005; Pasha and Khemraj, 2009; Louzis et al., 2010; Azeem et al., 2012). The explanation provided by the literature for this relationship is that, Changes in business cycle impact the credit worthiness of borrowers in terms of repayment capacity. Hence, strong positive growth in real GDP usually translates into more income which improves the debt servicing capacity of borrower which in turn contributes to lower NPLs. Conversely, when there is a slowdown in the economy (low or negative GDP growth), the economic activities in general are decreasing and the volume of cash held for either businesses or a household is decreasing. These conditions contribute in deteriorating the ability of borrowers to repay the loans, which lead to increase the likelihood of delays their financial obligations and thus banks“ exposure to credit risk

increase. In this regard, Hou (2006) noted that, each NPL in the financial sector is viewed as an obverse mirror image of an ailing unprofitable enterprise.

2.4 Review of Related Empirical Literature

This chapter provides so many evidences which identify the major determinants of bank loans, particularly, nonperforming loans. Some studies are conducted on particular country and the others on panel of countries. Hence many researchers have conducted a lot of study on determinants nonperforming loans (NPLs), due to its significance for the bank's failure. In case, the researcher starts reviewing empirical related literatures from the study made across country and then single country studies. There are a plenty of variables that affect the NPLs of banking sectors. In this study, the researcher focused on both bank specific and macroeconomic determinants of NPLs of commercial bank in Ethiopia. Internal factors are caused by internal functions and activities of bank, and are due to decisions and practices of officials and staff's functions. These factors are controllable in which the manager can prevents them through using suitable method, determination and elimination of weakness and improvement of process. Whereas, external factors can't be controlled by bank managers and are caused by external environment including effect on implementation of decisions and also government policies. For instance; unexpected events, changing in rules and obligations, political and economic changes (inflation and slump) are external factors (Biabani et al., 2012).

2.4.1. Across Countries Studies

Djiogap and Ngomsi (2012) were investigates the determinants of bank long-term loan in the Central African Economic and Monetary Community (CEMAC). They used the panel data of 35 commercial banks from six African countries over the period 2001-2010. They used fixed effect model to examine impact of bank size, GDP growth and capital adequacy ratio on NPLs. The study found negative significant impact of CAR on the level of NPLs. Their finding justifies as more diversified banks and well capitalized banks are better able to withstand potential credit. However, inflation variable is statistically insignificant in explaining the total business loans ratios of banks.

Skarica (2013) also conducted a study on the determinants of NPLs in Central and Eastern European countries. In the study, Fixed Effect Model and seven Central and Eastern European countries for 2007-2012 periods was used. The study utilized loan growth, real GDP growth rate,

market interest rate, Unemployment and inflation rate as determinants of NPLs. The finding reveals as GDP growth rate and unemployment rate has statistically significant negative association with NPLs with justification of rising recession and falling during expansions and growth has an impact on the levels of NPLs. This shows as economic developments have a 20 strong impact on the financial stability. The finding also reveals as inflation has positive impact with justification as inflation might affect borrowers' debt servicing capacities.

Selma and Jouini (2013) conducted a study on three countries namely Italy, Greece and Spain for the period of 2004-2008 to identify the determinants of non-performing loans for a sample of 85 banks. The variables included both macroeconomic variables (GDP growth rate, unemployment rate and real interest rate) and bank specific variables (return on assets, loan growth and the loan loss reserves to total loans). They apply Fixed Effect model and found a significant negative relationship of ROA & GDP growth rate, and also positive relationships of unemployment rate, the loan loss reserves to total loans and the real interest rate with NPLs. For a significant positive association between NPLs and real interest rate, they justify that when a rise in real interest rates can immediately leads to an increase in non-performing loans especially for loans with floating rate since it decrease the ability of borrowers to meet their debt obligations. In addition, a significant negative relationship between ROA and the amount of NPLs justify that a bank with strong profitability has less incentive to generate income and less forced to engage in risky activities such as granting risky loans.

Klein (2013) investigates the determinants and macroeconomic performance of NPLs in Central, Eastern, and South Eastern Europe (CESEE) for 1998 to 2011 period data for ten banks of each 16 countries. The study includes loan growth rate, inflation, unemployment rate and GDP growth rate as explanatory variables of the study. The study was used fixed effect/ dynamic model and found as inflation has positive whereas loan growth rate, GDP growth rate have negative significant effect on the occurrences of NPLs. However, the study found as unemployment rate has no significant effect on NPLs.

Makri et al. (2014) identify the factors affecting NPLs of Euro zone's banking systems for 2000- 2008 periods before the beginning of the recession exclusively pre-crisis period. The study includes 14 countries as a sample out of 17 total Euro zone countries. The variables included

were growth rate of GDP, budget deficit (FISCAL), public debt, unemployment, loans to deposits ratio, return on assets, and return on equity and capital adequacy ratio. The study utilized difference Generalized Method of the Moments (GMM) estimation and found as real GDP growth rate, ROA and ROE had negative whereas lending, unemployment and inflation rate had positive significant effect on NPLs. However, ROA & loan to deposit ratio, inflation, and budget deficit did not show any significant impact on NPL ratio. Similarly, Carlos (2012) on macroeconomic determinants of the Non-Performing Loans in Spain and Italy found as inflation rate has insignificant effect on NPLs.

2.4.2. Single Country Studies

One of the studies in this regard is that of Sakiru *et al.* (2011) on macroeconomic determinants of nonperforming loan on banking system in Malaysia. Their study was covered bank's data for monthly time series of 2007:1 to 2009: 12 period. In the study, lending rate, producer price and industrial production index were used as macroeconomic variables that affect the NPLs. The study utilized ARDL approach and the finding reveals that lending rate has a significant positive effect on NPLs and justifies that, during the period of high lending rate, NPLs is anticipated to increase causing a rise in the rate of default by borrowers.

Hyun and Zhang (2012) investigated the impact of macroeconomic and bank-specific factors of nonperforming loans in US for two distinct sub-sample periods that is from 2002-2006 (pre financial crisis) and 2007-2010(during financial crisis).The variables included both macroeconomic factors namely GDP growth rate, unemployment rate and lending rate, and bank specific variables such as Return on Equity (ROE), solvency ratio, inefficiency, bank size and non-interest income. In pre financial crisis period, the study found as solvency ratio, ROE, lending rate, GDP growth rate and unemployment rate negatively affect NPLs. Negative effect of lending rate on NPLs implies that an increase in lending rate curtail peoples' /business entity's' ability to borrow, which decreases the amount of loan and then reduce NPLs. Beside, statistically significant and negative solvency ratio effect on NPLs, implies that the higher the Solvency ratio, he lower the incentives to take riskier loan policies, and consequently, reduce the amount of problem loans. However, bank size has no effect. During financial crisis also solvency ratio, GDP growth rate, unemployment rate and ROE all have a negative impact on NPLs while lending rate has no significant effect on NPLs. Size allows for more diversification opportunities as larger banks can compose less concentrated

portfolios that include borrowers from different industries, geographical Locations, capital size and other customer segments.

Tomak (2013) conducted study on the “Determinants of Bank’s Lending Behavior of commercial banks in Turkish” for a sample of eighteen from 25 banks. The main objective of the study was to identify the determinants of bank`s lending behavior. The data was covered 2003 to 2012 periods. The variables used were size, access to long term funds, interest rates, GDP growth rate and inflation rate. The finding reveals that bank size, access to long term loan and inflation rate have significant positive impact on the bank`s lending behavior but, interest rates and GDP are insignificant.

Besides, Ahmed and Bashir (2013) conducted a study on the “Macroeconomic Determinants of Nonperforming Loan of Banking Sectors in Pakistan”: The study was conducted on 30 commercial banks from total of 34 banks in 1990-2011 periods. The main aim of the study was to investigate impact of inflation, credit growth, GDP growth rate, Unemployment rate, consumer price index and lending/interest rate, on nonperforming loan. They found negative effect of lending rate and GDP growth rate on NPLs. Their justification for negative association between lending rate and NPLs implies that as lending rate increase, individuals with funds starts saving with the banks to earn on their funds but investors with the profitable projects feel reluctant to borrow and invest. Besides, existing borrowers pay back their loans to keep their credit rating good as to get loans in the future at discount rates. Similarly, on their study of banks specific factor of NPLs of banking sectors in Pakistan from 2006-2011 in 2013, they found positive significant effect of ROA but insignificant effect of ROE on NPLs. Their justification for positive significant association between ROA and NPLs implies that in order to increase the short term earnings, banks management portray wrong picture to the investors relating the future profitability and positive return prospects. Consequently, investors start borrowing from the banks and invest in the less profitable projects. This results in the current good performance and profitability of the banks but because of the wrong forecasting, returns on the investments are not according to the investors’ expectation, resulting in the inability of the investors in repayment of loans thus leading to the growth in NPLs.

The study of Saba *et al.*(2012) on the title of “Determinants of Nonperforming Loan on US banking sector” also investigate the bank specific and macroeconomic variables of nonperforming

loans from 1985 to 2010 period using OLS regression model. They considered total loans, lending rate and Real GDP per capital as independent variables. The finding reveals as real total loans have positive significant effect whereas interest rate and GDP per capital has negative significant association with NPLs.

Ali and Iva (2013) who conducted study on “the impact of bank specific factors on NPLs in Albanian banking system” considered Interest rate in total loan, credit growth, inflation rate, real exchange rate and GDP growth rate as determinant factors. They utilized OLS regression model for panel data from 2002 to 2012 period. The finding reveals a positive association of loan growth and real exchange rate, and negative association of GDP growth rate with NPLs. However, the association between interest rate and NPL is negative but week. And also inflation rate has insignificant effect on NPLs.

Similarly, Shingjergji (2013) conducted study on the “impact of bank specific factors on NPLs in Albanian banking system”. In the study, capital adequacy ratio, loan to asset ratio, net interest margin, and return on equity were considered as a determinant factors of NPLs. The study utilized simple regression model for the panel data from 2002 to 2012 period and found as capital adequacy ratio has negative but insignificant whereas ROE and loan to asset ratio has negative significant effect on NPLs. Besides, total loan and net interest margin has positive significant relation with NPLs. The study justifies that an increase of the CAR will cause a reduction of the NPLs ratio. Besides, an increase of ROE will determine a reduction of NPLs ratio. Besides, Mileris (2012) on the title of “macroeconomic determinants of loan portfolio credit risk in banks” was used multiple and polynomial regression model with cluster analysis, logistic regression, and factor analysis for the prediction. The finding indicates that NPLs are highly dependent of macroeconomic factors.

However, Swamy (2012) conduct study to examine the macroeconomic and indigenous determinants of NPLs in the Indian banking sector using panel data a period from 1997 to 2009. The variables included were GDP growth, inflation rate, per capital income, saving growth rate, bank size, loan to deposit ratio, bank lending rate, operating expense to total assets, ratio of priority sector`s loan to total loan and ROA. The study found that real GDP growth rate, inflation, capital adequacy, bank lending rate and saving growth rate had insignificant effect; whereas loan to deposit

ratio and ROA has strong positive effect but bank size has strong negative effect on the level of NPLs.

Similarly, Farhan *et al.*(2012) on the title of “Economic Determinants of Non-Performing Loans: Perception of Pakistani Bankers” utilized both primary and secondary data in 2006 years. The data was collected from 201 bankers who are involved in the lending decisions or handling nonperforming loans portfolio. Correlation and regression analysis was carried out to analyze the impact of selected independent variables. The variables included were interest rate, energy crisis, unemployment, inflation, GDP growth, and exchange rate. The study found that, interest rate, energy crisis, unemployment, inflation and exchange rate has a significant positive relationship whereas GDP growth has insignificant negative relationship with the non-performing loans.

According to an Empirical Study made on Commercial Banks in Pakistan by Badar & Yasmin(2013) on the title of “Impact of Macroeconomic Forces on Nonperforming Loans” the long and short run dynamics between nonperforming loans and macroeconomic variables covering the period from 2002 -2011 of 36 commercial banks in Pakistan were assessed. In the stud, inflation, exchange rate, interest rate, gross domestic product and money supply were included as macroeconomic variables. They applied vector error correction model. The study found that as there is strong negative long run relationships exist of inflation, exchange rate, interest rate, gross domestic product and money supply with NPLs.

Besides, Daniel and Wandera (2013) conducted the study on the effects of credit information sharing on the nonperforming loan of commercial banks in Kenya. The objectives of the study was to assess the impact of credit information sharing on nonperforming loans, to identify the factors that account for bad loans and to determine the economic sector that records higher bad loans and the efforts taken to reduce the risk in this sector. Data was collected from primary sources and secondary data between 2007 to 2012 period. The variables included in the study were Information Asymmetry; Interest/lending rates, Management of loans and legal framework and Credit Criteria. The study found as lending rates has positive significant effect on NPLs. It justifies as these causes make many borrowers not to pay their loans hence leading to many bad loans.

Similarly, Joseph (2011) who conducted study on the title of effects of interest rate spread on the level of non-performing assets of commercial banks in Kenya was considered interest rate spread/cost of loan as independent and NPLs ratio as dependent variables. The study applied descriptive research design. Both primary and econdary data were considered from 43 commercial banks in 2010. It was analyzed by the help of SPSS software. The finding indicates that cost of loan/lending rate has a positive significant effect on the occurrences of NPLs. However, Konfi (2012) who conducted study on the determinants of nonperforming loans on the operations of SINAPI ABA TRUST microfinance institutions in Ghana found as high interest rate was not significant factors causing the incidence of NPLs. This study justifies as interest rate is only applicable to loan defaulters who have managed to pay off outstanding principal and are in default in only interest payment. If a borrower is in default of both principal and interest, then one cannot assert that high interest rate is the actually the cause of the loan default.

Besides, the study conducted in Ethiopia by Wondimagegnehu(2012) on “the determinants of Nonperforming loan on commercial banks of Ethiopia” also found as poor credit assessment, failed loan monitoring, underdeveloped credit culture, lenient credit terms and conditions, aggressive lending, compromised integrity, weak institutional capacity, unfair competition among banks, willful defaults by borrower and their knowledge limitation, fund diversion for un expected purposes and overdue financing has significant effect on NPLs. Besides, the study of Wondimagegnehu (2012) considers interest rate as bank specific factors and revealed as interest rate has no impact on the level of NPLs of commercial banks in Ethiopia.

2.5. Summary and Knowledge Gap

There are a plenty of variables that affect the NPLs of banking sectors. In this study, the researcher focused on both bank specific and macroeconomic determinants of NPLs of commercial bank in Ethiopia. Internal factors are caused by internal functions and activities of bank due to decisions and practices of officials and staff functions. These factors are controllable in which the manager can prevents them through using suitable method, determination and elimination of weakness and improvement of process. Whereas, external factors can`t be Loan to Deposit Capital Adequacy Return on Asset Return on Equity Inflation Lending rate Effective Tax rate Bank Specific Factors Nonperforming Loan Macroeconomic Factors controlled by bank managers and are caused by external environment including effect on implementation of decisions and also

government policies. These factors are policy (monetary and fiscal) related factors. For instance; unexpected events, changing in rules and obligations, political and economic changes (inflation and collapse) are external factors (Biabani *et al.* 2012). However, the variables that got more attention and included in this thesis were loan to deposit ratio, capital adequacy/solvency ratio, profitability (ROA & ROE), lending rate and effective tax rate.

A plenty of studies were done on determinants of NPLs in different countries. Even though, the determinants of NPLs are still debatable among different researchers that might be due to situational factors like country level factors, bank level factors and the condition of legal and regulatory framework of the country. Thus, these debates can only be resolved through quantitative analysis on the determinants of NPLs.

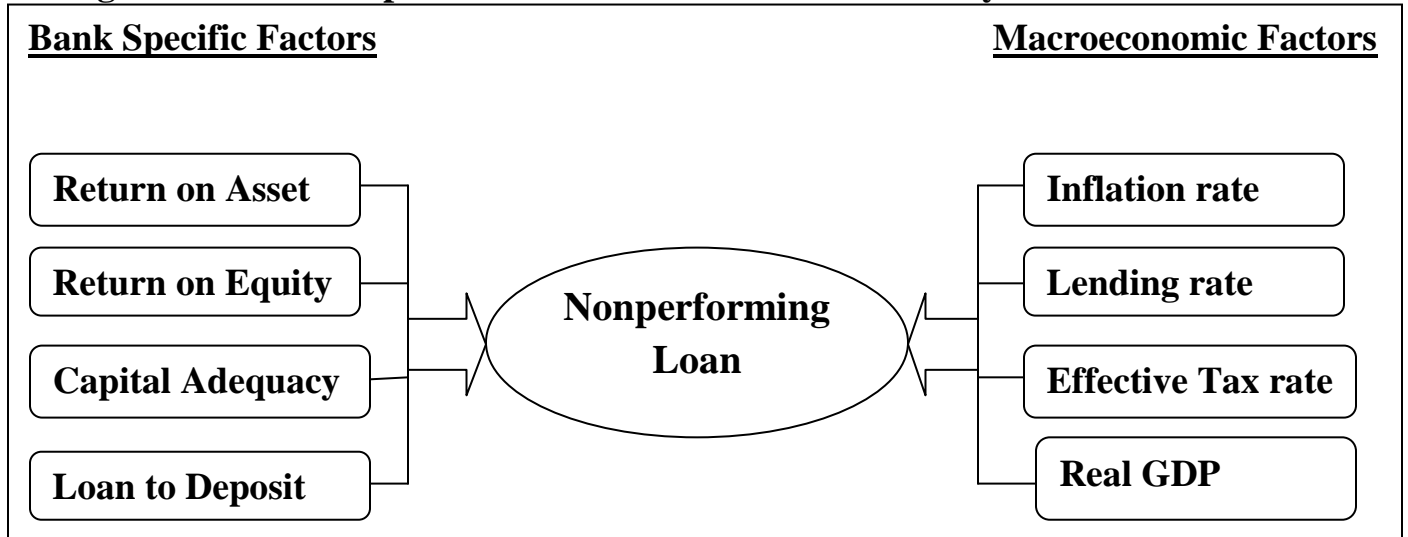
Besides, most of the related literatures reviewed cover different studies made both in developing and developed countries' banking industries. Even if quite numbers of studies have investigated on the determinants of NPLs, most of these studies have been done in developed countries with few being done in developing countries. Thus, as to the knowledge of the researcher, there is still limited number of literatures in Ethiopian banking industry, with the exception of study made by Wondimagegnehu (2012) and Gadise Gezu (2014) on the determinants of NPLs of banking industry in Ethiopia. Hence, this previously done study by Wondimagegnehu (2012) utilized only bank specific factors. Wondimagegnehu (2012) considers interest rate as bank specific factors and revealed as interest rate has no influence on the level of NPLs.

Furthermore, bank profitability and capital adequacy ratio that considered as basic determinants of NPLs were not included in his study since these variables are widely used by different researchers. Besides, even if taxation is not used in further study before, the researcher add as one of the determinant factors of NPLs in this study based on theoretical literatures and its sensitivity in the country specifically in Ethiopia. Likewise due to rapid expansion of banking institution in Ethiopia, it is better to conduct this investigation to ensure their continuous operation. As to the knowledge of the researcher, there is only one study made by Gadise Gezu (2014) on the determinants of nonperforming loans on Ethiopian commercial banks including public banks. Therefore, this study seeks to fill this gap by establishing the link between nonperforming loans and its determinants (bank specific and macroeconomic factors) in commercial banks in Ethiopia.

2.6 Conceptual Frame Work

From the theoretical and empirical literature reviews, the following conceptual framework of the study is developed by the researcher.

Figure 2.1 the conceptual framework or model of the study



Source: Extracted by the researcher.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter is organized in eight sub sections. In its first part there is a research design, then after it presented subsequently about research approach, population, sample and sampling technique, data type, sources and instruments, data analysis and model specification. The final two parts presented variables selection and hypothesis developments. Finally, operationalizations of study variables are presented.

3.1 Research Design and Approach

3.1.1. Research Design

Research design is a master plan specifying the methods and procedures for collecting and analyzing the required data. The choice of research design depends on objectives that the researchers want to achieve (John, 2007).

Cooper et al. (2003) discussed that explanatory studies unlike descriptive studies, go beyond observing and describing the condition and tries to explain the reasons of the phenomenon.

As noted by Kothari (2004), explanatory research design examines the cause and effect relationships between dependent and independent variables.

Thus, explanatory research design was used in this research because this study was examined the cause and effect relationships between NPLs and its determinants which is appropriate for the objective of the study.

3.1.2 Research Approach

When conducting a research, there are different ways of approaching the problem. According to Creswell (2009), there are three approaches of research; quantitative, qualitative and mixed. The following discussions briefly presents the basic features of these research approaches. Quantitative research is a means for testing objective theories by examining the relationship among variables (Creswell, 2009). On the other hand, qualitative research approach is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem with intent of developing a theory or pattern inductively (Creswell, 2009). Finally, mixed methods approach is an approach in which the researchers emphasize the research problem and use all approaches

available to understand the problem (Creswell, 2003). Hence, based on the above discussions of the three research approaches and by considering the research problem and objective, this study used mixed research approach. Therefore, to have a better insight and gain a richer understanding about the determinant of nonperforming loans in commercial banks of Ethiopia, the quantitative method supplemented by the qualitative method of inquiry that helps to get benefits of a mixed methods approach and to mitigate the bias in adopting only either quantitative or qualitative approach.

Thus, employing mixed approach is used to counterbalance the biases (limitations) of applying any of a single approach and a means to offset the weaknesses inherent within method with the strengths of the other method (Creswell, 2003). In addition, adopting mixed approach in this study is justified as it provides the best understanding of a research problem because it can open the door to multiple methods of data collection and to both generalize the findings to a population and develop a detailed view of the meaning of a phenomenon or concept for individuals (Creswell, 2003). Thus, this study employed mixed research approach start with a quantitative study and identifies results then follows up these results with an unstructured in-depth interview of qualitative study to have a better understanding about the determinant of nonperforming loans in commercial banks of Ethiopia.

3.2 Population of the Study

The study populations are all private and state owned commercial banks in Ethiopia registered by NBE. Currently, there are eighteen banks in Ethiopia. These are commercial bank of Ethiopia (CBE), Awash international bank (AIB), bank of Abyssinia (BOA), Wegagen bank (WB), United bank (UB), Nib international bank (NIB), Dashen bank (DB), Development bank of Ethiopia (DBE), Cooperative bank of Oromia (CBO), Lion international bank (LIB), Zemen bank (ZB), Oromia international bank (OIB), Buna international bank (BIB), Berhan international bank (BIB), Abay bank S.C (AB), Addis international bank S.C (AdIB), Debu Global bank, S.C (DGB) and Enat banks (EB). However, from all the above listed banks, Development bank of Ethiopia is not Commercial bank.

3.3 Sampling Design

Sample design deals with sample frame, sample size and sampling technique. Sampling is a technique of selecting a suitable sample for the purpose determining parameters of the whole population. Population is the list of elements from which the sample may be drawn (John, 2007).

A sample is drawn to overcome the constraints of covering the entire population with the intent of generalizing the findings to the entire population.

As noted by Kothari (2004), good sample design must be viable in the context of time and funds available for the research study. Besides, judgmental sampling offers the researcher to deliberately select items for the sample concerning the choice of items as supreme based on the selection criteria set by the researcher.

Therefore, the data for this study was collected from seven commercial banks in the country. Out of the seven commercial banks, commercial bank of Ethiopia(CBE) is state owned banks whereas the remaining six banks:-Awash international bank(AIB), bank of Abyssinia(BOA), Wegagen bank(WB), United bank(UB), Nib International bank(NIB) and Dashen bank(DB) are private banks that were registered before 2007/08 by NBE.

These commercial banks were selected due to their market share, total assets and profit. As NBE (2015/16) annual report stated that these seven banks together accounted for 64.7% of the market share based on their number of branch and capital held by all Ethiopian commercial banks. In addition, those commercial banks should operate before 2007/08 having financial statements for consecutive ten years. Based on these reasons, it is reasonable that sample of seven commercial banks can properly refer the total number of the population.

According to Suheyli (2015) as cited in Singh (2006) when the subjects used in the sample is homogeneous, using purposive sampling technique is appropriate. Hence, the researcher employed purposive sampling method to draw the required sample of banks from the above listed population and meet the study objective. The matrix for the frame is 10×7 that includes 70 observations.

This is due to the fact that since the primary aim of this study is to examine the determinants of nonperforming loans of commercial banks in Ethiopia, it is better to make generalization for the banking sector of the country based on data drawn from sample bank which is much more experienced in the industry. Further, lending is not a one night process rather it comes by making operation for some consecutive years since the bank should have to accept deposit to grant loans to reach stage of suffering from poor asset quality.

Thus, as one can understand from objective of the study, the researcher aimed to examine the determinants of nonperforming loans of commercial banks in Ethiopia. In order to achieve the stated objective in this study, the researcher focused on seven banks that were established to give commercial banking services only and those operating before 2007/08. And, the researcher used 10

years data of selected commercial banks that provide financial statements consecutively from 2007-2016 periods.

3.4 Data Sources and Instruments

As noted by Kothari (2004), data has to be analyzed in line with the purpose of the research plan after data collection. Accordingly, this study obtained the necessary data through both primary and secondary data. This research mainly used from secondary sources of data, but for the purpose of supporting the findings of the research, primary data source is employed to provide reasonable and strong analysis. Primary data on determinant of nonperforming loans is collected from the sample of seven commercial banks' credit department managers and senior loan officers of the respective banks through unstructured face to face interview. In addition to this, secondary data on sample of seven banks were obtained from NBE, CSA and head office of each respective banks audited financial statements and annual reports filed with NBE through document review. Thus, this study utilized both descriptive and econometric analysis based on a panel data from 2007-2016 to examine the relationship between the NPLs and its determinant factors in commercial banks found in Ethiopia. The data collected from different sources were coded, checked and entered to simple excel program to make the data ready for analysis. Then the collected data was processed and analyzed through e view version 8 software packages.

For descriptive analysis; table and percentage were used to analyze the data. Besides, results of the descriptive statistics such as mean, standard deviation, minimum and maximum values were reported to describe the characteristics of variables under investigation. Furthermore, various diagnostic tests such as normality, heteroscedasticity, autocorrelation and multicollinearity test were conducted to decide whether the model used in the study is appropriate and to fulfill the assumption of classical linear regression model.

Thus, in order to examine the possible degree of Multicollinearity among variables, correlation matrixes and variance inflation factor were used. To this end, the researcher used fixed effect regression model analysis to examine the effect of each explanatory variable on nonperforming loans of commercial bank in Ethiopia. Thus, regression results were presented in a tabular form with the appropriate test statistics and then an explanation of each parameter were given in line with the evidence in the literature.

3.5 Data Analysis

To achieve objective of the study, the study mainly concentrated on quantitative analysis and supported by qualitative analysis. Hence, the researcher used econometric model to identify and measure the effect of nonperforming loans of Ethiopian commercial banks and used Ordinary Least Square (OLS) method using Eviews-8 econometric software package for the study. According to Brooks (2008) regression is concerned with describing and evaluating the relationship between a given variable (usually called the dependent variable) and one or more other variables (usually known as the independent variables. Thus, the researcher adopted panel data regression model to examine the effect of nonperforming loans of Ethiopian commercial banks.

As stated by Brooks (2008) panel data is favored for situation often arises in financial modeling where we have data comprising both time series and cross-sectional elements. In addition, we can address a broader range of issues and tackle more complex problems with panel data than would be possible with pure time-series or pure cross-sectional data alone. Accordingly, the study model focused on panel data technique that comprises both cross-sectional elements and time-series elements; the cross-sectional element is reflected by the different Ethiopian commercial banks (Seven) and the time-series element is revealed by the period of study (2007-2016). Therefore, the collected panel data is analyzed using descriptive statistics, correlations and multiple linear regression analysis. The rational for choosing Ordinary Least Square (OLS) is that, if the Classical Linear Regression Model (CLRM) assumptions hold true, then the estimators determined by OLS will have a number of desirable properties, and are known as Best Linear Unbiased Estimators (Brooks, 2008). Diagnostic checking is done to test whether the sample is consistent with the following assumptions. According to Brooks (2008), the assumptions of ordinary least squares are:

- I. The errors have zero mean ($E(u_t) = 0$)
- II. Variance of the errors is constant ($\text{Var}(u_t) = \sigma^2 < \infty$)
- III. Covariance between the error terms over time is zero ($\text{cov}(u_i, u_j) = 0$ for $i \neq j$)
- IV. Test for Normality ($u_t \sim N(0, \sigma^2)$)
- V. Multicollinearity Test

If all the above assumptions are consistent with the sample, E-view result will be accurate and reliable. The following tests are done in this research to test the above assumptions.

I. The errors have zero mean ($E(u_t) = 0$)

Relay on Brooks (2008), the first assumption required is that the average value of the errors is zero. In fact, if a constant term is included in the regression equation, this assumption will never be violated.

II. Variance of the errors is constant ($\text{Var}(u_t) = \sigma^2 < \infty$) (heteroscedasticity)

According to Brooks (2008), the variance of the errors 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 heteroscedasticity occur, the estimators of the ordinary least square method are inefficient and hypothesis testing is no longer reliable or valid as it will underestimate the variances and standard errors. There are several tests to detect the Heteroscedasticity problem, which are Park Test, Glesjer Test, Breusch-Pagan-Goldfrey Test, White's Test and Autoregressive Conditional Heteroscedasticity (ARCH) test. In this study, the popular white test was employed to test for the presence of heteroscedasticity. The hypothesis for the Heteroscedasticity test was formulated as follow;

H0: There is no Heteroscedasticity problem in the model.

H1: There is Heteroscedasticity problem in the model.

$\alpha = 0.05$

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

III. Covariance between the error terms over time is zero ($\text{cov}(u_i, u_j) = 0$ for $i \neq j$) (Autocorrelation)

According to Brooks (2008), when the error term for any observation is related to the error term of other observation, it indicates that autocorrelation problem exist in this model. In the case of autocorrelation problem, the estimated parameters can still remain unbiased and consistent, but it is inefficient. The result of T-test, F-test or the confidence interval will become invalid due to the variances of estimators tend to be underestimated or overestimated. Due to the invalid hypothesis testing, it may lead to misleading results on the significance of parameters in the model. Therefore, the study test for the existence of autocorrelation, the popular Durbin-Watson test and Breusch-Godfrey test were employed.

H0: There is no autocorrelation problem in the model.

H1: There is autocorrelation problem in the model.

$\alpha = 0.05$

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

VI. Normality ($ut \sim N(0, \sigma^2)$)

As per Brooks (2008) normality tests are used to determine if a data set is well-modeled by a normal distribution. With the normality assumption, ordinary least square estimation can be easily derived and would be much more valid and straight forward. This study used Jarque Bera Test (JB test) to find out whether the error term is normally distributed or not. The hypothesis for the normality test was formulated as follow:

H_0 : Error term is normally distributed

H_1 : Error term is not normally distributed

$\alpha = 0.05$

Decision Rule: Reject H_0 if p-value of JB tests less than significance level. Otherwise, do not reject H_0 .

IV. Multicollinearity

According to Brooks (2008), Multicollinearity will occur when some or all of the independent variables are highly correlated with one another. If the multicollinearity occurs, the regression model is unable to tell which independent variables are influencing the dependent variable. This study used high pair-wise correlation coefficients method to test the presence of multicollinearity problem in a regression model, because it shows the correlation of independent variables between each other one by one. Malhotra (2007) stated that multicollinearity problems exists when the correlation coefficient among explanatory variables should be greater than 0.75. However, Brooks (2008) mentioned that if the correlation coefficient along with the independent variables is 0.8 and above, multicollinearity problems will be existed.

Model Specification Test

According to Brooks (2008), Specification error occurs when omitting a relevant independent variable, including unnecessary variable or choosing the wrong functional form, so that regression model will be wrongly predicted. If the omitted variable is correlated with the included variable, the estimators are biased and inconsistent. If the omitted variable is not correlated with the included variable, the estimators are unbiased and consistent. Ramsey RESET test was used to see whether the developed model is correctly regressing.

H_0 : the model is correctly specified

H_1 : the model is not correctly specified

$\alpha = 0.05$

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

3.6 Model specification

According to Brooks (2008), it is very easy to generalize the simple model to one with k regressors (independent variables). $Y_i = \beta_1 + \beta_2 x_{1i} + \beta_3 x_{2i} + \dots + \beta_k x_{ki} + \epsilon_i$, $i = (1, 2, \dots, i)$. So, Where Y_i is the i th observation of the dependent variable, X_{1i}, \dots, X_{ki} are the i th observation of the independent variables, β_0, \dots, β_k are the regression coefficients, ϵ_i is the i th observation of the stochastic error term.

Accordingly, to test the determinants of nonperforming loan of commercial banks of Ethiopia, the researcher estimated a linear regression model in the following form.

$$\text{NPL}_{it} = \beta_0 + \beta_1 \text{CAR}_{it} + \beta_2 \text{ETR}_{it} + \beta_3 \text{INFR}_{it} + \beta_4 \text{LIR}_{it} + \beta_5 \text{LTD}_{it} + \beta_6 \text{ROA}_{it} + \beta_7 \text{ROE}_{it} + \beta_8 \text{ROA}_{it} + \epsilon$$

Source: developed by the researcher

Where:

CAR= Capital Adequacy Ratio

ETR= Effective Interest Rate

INFR= Inflation Rate

LIR=Lending Interest Rate

LTD= Loan to deposit Ratio

ROA= Return on asset

ROE= Return on Equity

GDP=Gross Domestic Product

ϵ =is the error component for commercial bank i at time t assumed to have mean zero $E[\epsilon_{it}] = 0$

β_0 = Constant

$\beta = 1, 2, 3 \dots 7$ are parameters to be estimate;

i = Commercial Banks $i = 1 \dots 7$; and t = the index of time periods and $t = 1 \dots 10$

3.7. Variables description and Hypothesis development

According to Creswell (2009), to make it is clear to readers what groups are receiving the experimental treatment and what outcomes are being measured, the variables need to be specified in quantitative researches.

Thus, this section explained the variables used as dependent and independent (explanatory) variables in the study. The definitions and measurements that are used for these variables are described as follows. In addition to this, hypothesis is also developed derived from previous empirical evidences.

Nonperforming loan ratio is dependent variables used in this study. It is measured in terms of Nonperforming loans to gross loan. Besides, explanatory variables included in this study are loan to deposit ratio, capital adequacy ratio, inflation rate, return on asset, return on equity, lending rate and effective tax rate. As noted by Brooks (2008) including more than one explanatory variable in the model never indicates the absence of missed variables from the model. Thus, to minimize the effect of missed variables from the model, the researcher was included disturbance term in this study.

3.7.1 Dependent Variable

Nonperforming Loan

By and large, NPLs are loans that are outstanding both in its principal and interest for a long period of time disagreeing to the terms and conditions under the loan contract as noted by (Gesu, 2014). Any loan facility that is not current in terms of repayment both on principal and interest conflicting to the terms of the loan agreement is NPLs. Thus, the amount of nonperforming loan measures the quality of bank assets (Tseganesh, 2012).

According to the Ethiopian banking regulation, “Nonperforming loan and advances are a loan whose credit quality has deteriorated and the full collection of principal and/or interest as per the contractual repayment terms of the loan and advances are in question” (NBE, 2008). NPL is a loan that delays for the payment of principal and interest for more than 90 days. Deterioration in asset quality is much more serious problem of bank unless the mechanism exists to ensure the timely recognition of the problem. It is a common cause of bank failure. Poor asset quality leads nonperforming loan that can seriously damage a banks’ financial position having an adverse effect on banks operation (Lafunte, 2012).It distresses the performance and survival of banks (Mileris, 2012). As per the NBE (2012) directive, NPLs are classified as Substandard, Doubtful and Loss. It is measured or indicated by the amount of NPLs to gross loans.

$$\text{NPL ratio} = \frac{\text{NPLs}}{\text{Gross Loan}}$$

3.7.2 Independent Variables

Independent variables are explanatory variables that explain the dependent variables. Previous researches on the determinants of banks' NPLs have shown that, independent variables that can explain the variation on NPLs are classified into bank-specific and macroeconomic variables (Azeem et al. 2012, Delgado and Vallcorba 2007, Louzis et al. 2010 and Aktan 2009). The bank-specific variables are internal factors and controllable for banks' managers while the macroeconomic variables are uncontrollable and hence external.

Accordingly, independent variables included in this study are indicators of bank profitability (ROA and ROE), solvency/capital adequacy ratio (CAR), loan to deposit ratio (LTD), lending rate (LR), and inflation rate (IFLR), and effective tax rate (ETR). Majority of these variables are modified and adopted from previously done studies based on the extent of their effect on nonperforming loan whereas one of these variables, that is effective tax rate is added from Gadise Gezu.

Therefore, the following subsections presented the bank-specific and macroeconomic variables used in the econometrics model of this study.

3.7.2.1. Bank Specific Variables

The existing literature provides evidence that suggests a strong association between NPLs and several bank specific variables. The bank specific variables that are usually theorized as determinants of NPLs are include, loan growth, financial performance, bank size, ownership structure, the quality of the loan portfolio and operational efficiency. Hence, the following part of this subsection presents the bank-specific variables used in this study.

Bank Profitability

Bank profitability may reflect the risk taking behavior of bank managements. Banks with high profitability are less over stressed for revenue creation and thus less forced to engage risk credit offering. However, inefficient banks are more likely to experience high level of problem loans since they are tempted to grant and to engage in more uncertain credits to defend their profitability and meet the prudential rules imposed by monetary authorities (Boudriga *et al* 2009). Poor management can imply weak monitoring for both operating cost and credit quality of customers, which will include high levels of capital losses (Haneef *et al.* 2012). Thus, both ROA and ROE are considered as profitability indicators of bank in this study.

Return on Asset (ROA): represents efficiency in asset utilization and shows how much net income is generated out of assets. It indicates the ability of bank management to generate profits by utilizing the available assets of the bank. Thus, if the ratio of ROA is high, it indicates that it is better performance in order to generate profit. Strong bank profitability measured in terms of ROA might result from high lending rate, fees and commission that lead bank growth in size and profitability. Thus, ROA gives an idea as to how efficient management is at using its assets to generate earnings.

Different researchers found different results regarding the relationship between ROA and NPLs.

For instance: - Ahmed and Bashir (2013) and Makri *et al.*(2014,) were examined positive significant relationships between ROA and NPLs. However, Boudriga *et a.*, (2009) and Selma and Jouini (2013) found negative association between NPLs and ROA by supporting the arguments that states deterioration of profitability ratio measured in terms of ROA leads to riskier activities of banks and then raise the level of NPLs. They justified that since ROA represents efficiency in asset utilization, poor utilization of assets leads higher NPLs for the banks. Thus, this ratio is expected to have negative relationships with NPLs in this study. It is measured by the ratio of net profit to total asset as follows;

$$ROA = \frac{\text{Net Profit}}{\text{Total Asset}}$$

H1: *There is a significant positive relationship between return on asset and bank's NPL.*

Return on Equity (ROE): represents the rate of return received from equity invested in banks. It is the amount of net income returned as a percentage of shareholders equity. Return on equity measures profitability by revealing how much profit a bank can generate with the money shareholders have invested. Thus, ROE measures how much the bank is earning on their equity investment. Many researchers were found different results between NPLs and bank profitability measured in terms of ROE. For instance:-Shigjerji (2013) and Ahmed and Bashir (2013) and Makri *et al.*(2014)found negative relationships between ROE and NPLs. Therefore, this ratio is expected to have negative relationships with NPLs. It is measured by the ratio of net profit to total equity.

$$ROE = \frac{\text{Net Profit}}{\text{Total Equity}}$$

H2: *Return on equity has negative and statistically significant effect on NPLs of banks.*

Capital Adequacy Ratio (CAR)

Capital adequacy is a measure of bank's financial strength since it shows the ability to withstand/tolerate with operational and abnormal losses. It also represents the ability to undertake additional business (Habtamu, 2012). As noted by Makri *et al.* (2014), CAR determines risk behavior of banks. It is a measure of banks solvency and ability to absorb risk.

Thus, this ratio is used to protect depositors and promote stability and efficiency of financial systems. According to Makri *et al.* (2014), there is negative relationship with NPLs indicating a risky loan portfolio is marked by a high NPL (equivalent to high credit risk). However, Djio gap and Ngoms i (2012) found positive association between NPLs and capital adequacy ratio. It is measured by total Equity to total asset ratio. However, it is expected to have negative association with NPLs in this study. This implies that well capitalized banks are less incentive to take risk.

$$\text{CAR} = \frac{\text{Total Equity}}{\text{Total Asset}}$$

H3: Capital adequacy ratio has negative and statistically significant effect on NPLs of banks.

Loan to deposit Ratio (LTD)

Loan to deposit (LTD) ratio examines bank liquidity by measuring the funds that a banks has utilized into loans from the collected deposits. It demonstrates the association between loans and deposits. Besides, it provides a measure of income source and also measures the liquidity of bank asset tied to loan (Makri *et al.*, 2014). This ratio also measures customer friendliness of banks implies that relatively more customer friendly bank is most likely face lower defaults as the borrower will have the expectation of turning to bank for the financial requirements (Ranjan and Chandra, 2003). Thus, it represents a bank's preference for credit. It is credit culture that represents a bank's preference for credit. It is measured in terms of loan to deposit ratio. There is empirical evidence that shows as LTD ratio has significant effect on the level of NPLs of banking sectors in different aspects. In this study, this ratio is expected to have positive relation with NPLs.

$$\text{LTD} = \frac{\text{Total Credit}}{\text{Total Deposit}}$$

H4: Loan to deposit ratio has negative and statistically significant effect on banks NPL.

3.7.2.2 Macroeconomic Variables

Apart from bank specific variables, there is abundant empirical evidence that suggests that several macroeconomic factors are important determinants of NPLs. Several macroeconomic factors which the literature proposes as important determinants of NPLs are: annual growth in GDP, the annual inflation rate, real effective exchange rate (REER), annual unemployment rate, broad money supply (M2) and GDP per capital (Salas and Suarina, 2002; Rajan & Dhal, 2003; Fofack, 2005; Jimenez and Saurina, 2005). This study only considers Lending Rate/Interest Rate, Inflation Rate and Effective Tax Rate.

Lending Rate/Interest Rate

Lending rates are one of the primary economic determinants of NPLs. It is the cost of borrowed funds. Interest rate spread is a measure of profitability between the cost of short term borrowing and the return on long term lending. Interest rate spread affect performing assets in banks as it increases the cost of loans charged on the borrowers (Joseph, 2011). Interest rate is the price a borrower pays for the use of money they borrowed from the lenders. Interest can be thought of as rent of money.

Thus, lending rate is a rate of return usually remains in admittance of monetary regulators (NBE) to manipulate the pursuance of monetary objectives. In case, maximum and minimum lending rate is set by NBE.

There is empirical evidence showing a positive and negative association between lending rate and NPLs. For instance: - Saba *et al.*(2012) found negative association between lending rate and NPLs whereas Farhan *et al.*(2012) and Ranjan and Chandra (2003)found as there is a positive relationship with NPLs and lending rate since an increase in interest rate curtails the paying capacity of the borrowers. Thus, lending rate is expected to have positive association with NPLs in this study. Accordingly, this study considers average lending rate (average of Minimum and Maximum Lending Rate) as proxy of lending rate as being commonly used by commercial banks for pricing loans.

H5: There is a significant positive relationship between real interest rate and bank's NPLs.

Inflation Rate

It is a situation in which the economies overall price level is rising. It represents sustained and pervasive increment in aggregate price of goods and services resulting decline in purchasing power of money. Accordingly, when inflation is high and unexpected, it can be very costly to an economy. At the same time, inflation generally transfers resources from lender and savers to borrowers since

borrowers can repay their loans with birr that are worthless. It is determined as the general consumer price index. This indicates that, as inflation increase, the cost of borrowing gets more expensive and deteriorates the quality of loan portfolio.

There are ambiguous results regarding the relationship between NPLs and inflation rate. According to Farhan *et al.*(2012), Skarica(2013), Klein(2013) and Tomak(2013) found as there is a positive relationship between NPLs and Inflation rate. Theoretically, inflation should reduce the real value of debt and hence make lending easier. However, high inflation may pass through to nominal interest rates, reducing borrowers' capacity to repay their debt. Through its attraction with the tax system, it can increase tax burden by artificially increasing income and profits.

Besides, inflation cause firms to increase their costs of changing prices. Finally, it made individuals to hold less cash and make more trips to banks since inflation lowers the real value of money holdings. It can negatively affect the borrowers' real income when wages are stick. Besides, price stability is considered as prerequisites for ones' countries economic growth (Skarica, 2013).

Thus, Consumer price index is used in this study as the proxy of inflation since most ample measure of inflation defines a change in the price of consumer goods and services purchased by households. Increase in CPI requires monetary regulators to use contractionary measures by increasing the interest rate to control inflation which later increase the cost of borrowing and ultimately cause NPLs. Keeping this information in mind, the relationship between NPLs and inflation is expected to be negative for this study. In case, the figure amount of CPI was taken from CSA.

H6: There is a significant positive/negative relationship between inflation and bank's NPLs.

Effective Tax Rate

Taxation in banking sectors represents the ability of banks to allocate its portfolios for its taxes. Corporate income tax rate affect the bank loans in different aspects. High tax burden enable the banks to shift the tax burden either by increasing lending rate and fees or paying low interest rate on deposits (Albertazzi and Gambacorta, 2006). Thus, bank is capable of transferring the tax costs to its customers by raising fees and interest spreads (Khan *et al.*2011). Bank with high debt pay less taxes due to higher interest expense. Accordingly, even if there is no specific study conducted using taxation as a determinant factor of NPLs, this study expects positive relationships between tax rate and NPLs.

H7: There is a significant positive/negative relationship between effective tax rate and bank's NPLs.

Real GDP growth: there is an inverse relationship between GDP growth and the level of NPLs reported by commercial banks (Salas and Suarina (2002), Jajan and Dhal (2003), Fofack (2005) , Hou (2006) , Jimenez and Saurina (2005), Pasha and Khemraj (2009), Louzis et al. (2010) and Azeem et al. (2012)). The explanation provided by the literature for this relationship is that, Changes in business cycle impact the credit worthiness of borrowers in terms of repayment capacity. Hence, strong positive growth in real GDP usually translates into more income which improves the debt servicing capacity of borrower which in turn contributes to lower NPLs. Conversely, when there is a slowdown in the economy (low or negative GDP growth), the economic activities in general are decreasing and the volume of cash held for either businesses or a household is decreasing. These conditions contribute in deteriorating the ability of borrowers to repay the loans, which lead to increase the likelihood of delays their financial obligations and thus banks' exposure to credit risk increase. In this regard, Hou (2006) noted that, each NPL in the financial sector is viewed as an obverse mirror image of an ailing unprofitable enterprise.

H8: There is a significant positive relationship between real GDP and bank's NPLs.

In addition to the above hypothesis, the following two specific research questions were also formulated.

RQ1. What are the determinants of banks' non-performing loans in Ethiopia commercial banking sector?

RQ2. What are the likely causes for the existence of variation on NPLs performance among Ethiopian commercial banks?

Generally, expected Sign of Variables are presented in table 3.1 as follows.

Table 3.1: Expected Sign (+/-) of Explanatory Variables in this Study

| Explanatory Variables | Expected Sign | Some empirical evidence |
|-------------------------------|----------------------|--|
| Loan to Deposit Ratio | + | Swamy (2012) |
| Capital Adequacy Ratio | - | Shingjerji(2013),Hyun&Zhang(2013), Makri <i>et al.</i> (2014), Klein(2013) |
| Return on Asset | - | Swamy(2012), Selma and Jouini(2013), Bougriga <i>et al.</i> (2009) |
| Return on Equity | - | Makri <i>et al.</i> (2014), Klein(2013), Shingjerji(2013) |
| Average Lending interest Rate | + | Farhan <i>et al.</i> (2012), Sakiru <i>et al.</i> (2011) |
| Inflation Rate | - | Farhan <i>et al.</i> (2012), Skarica(2013), Klein(2013), Tomak(2013) |
| Real GDP | - | Salas and Suarina(2002), Jajan and Dhal (2003), Fofack (2005) |
| Effective Tax Rate | + - | |

Sources: Swamy (2012), Shingjerji(2013), Hyun&Zhang(2013), Makri et al.(2014), Klein(2013), Selma and Jouini(2013), Makri et al.(2014), Klein(2013), Farhan et al.(2012), Sakiru et al(2011) and other studies included in the study.

Notes: A positive sign “+” indicates direct impact; whereas a negative sign “-” indicates an inverse impact of explanatory variables on dependent variable.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

This chapter deals with the results and analysis of the findings and it contains three sections. The first section presented descriptive and correlation analysis on variables of the study; the second section presented fulfillment of the classical linear regression model (CLRM) assumptions; the third section laid down the results of regression and interview analysis that constitute the main findings of this study.

4.1 Introduction

The determinants of NPLs of banking sectors have been studied by many researchers across the world. However, the literature lacks more evidence regarding Ethiopian context. Thus, this study was conducted to examine the determinants of NPLs of commercial banks in Ethiopian context to contribute its own effort for the empirical evidence. The banks that are included in this study were all senior commercial banks those operate before 2006/07. In case, the data for this study was drawn from seven commercial banks for 2007 to 2016 periods. To this end, 70 observations were analyzed to examine the determinants of NPLs of Commercial banks in Ethiopia.

4.2 Study Variables

This study was examined both macro and bank specific determinants of NPLs. Bank specific variables were drawn from financial statement of banks that are taken from the NBE and head office of each commercial bank whereas macroeconomic factors were taken from CSA except Effective tax rate that calculated from banks' financial statements. As stated in previous chapters, NPL is dependent variables whereas loan to deposit ratio, return on equity, return on asset, capital adequacy ratio, lending rate, inflation, and gross domestic product and effective tax rate are an explanatory in this study. In case, measurements and explanations of the above mentioned variables are presented in the following table as follows:

Table 4.1 Explanation of Study Variables

| Variables | Explanations |
|--------------------------------|--|
| Nonperforming loan ratio(NPLs) | Calculated as nonperforming loan to gross loan |
| Loan to deposit (LTD) | Calculated as total loan to total deposits |
| Capital adequacy ratio(CAR) | Calculated as total Owner's equity to total asset |
| Return on equity(ROE) | Calculated as net profit to owner's equity |
| Return on asset (ROA) | Calculated as net profit to total asset |
| Average lending rate(ALR) | Calculated as the summation of minimum and maximum lending rate divided by two |
| Inflation(INF) | Calculated as consumers price index |
| Effective Tax Rate (ETR) | Calculated as Tax to net income before tax |
| Gross Domestic Product (GDP) | Calculated as the annual percentage change in the real GDP |

Source: own computation from the financial statements (NBE) and MoFED.

4.3 Descriptive Statistics

Table 4.2 provides a summary of the descriptive statistics of the dependent and independent variables for seven commercial banks in Ethiopia from the year 2007 to 2016 with a total of 70 observations (i.e. data of seven banks for the period of ten years). The table shows the mean, minimum, maximum, standard deviation and number of observations for the dependent variable of bank's nonperforming loan (NPL) and the independent variables Capital Adequacy ratio (CAR), Effective Tax rate (ETR), Gross Domestic Product (GDP), Inflation rate (INFR), Average Lending rate (ALR), Loan to Deposit ratio (LTD), Return on Asset (ROA), and Return on Equity (ROE), data over the period under consideration.

Table 4.2 Summary of Descriptive statistics for dependent and independent variables

| | NPL | ALR | CAR | ETR | GDP | INFR | LTD | ROA | ROE |
|--------------|------------|------------|------------|------------|------------|-------------|------------|------------|------------|
| Mean | 0.051408 | 0.278703 | 0.124944 | 0.289891 | 0.100300 | 0.171500 | 0.581900 | 0.027808 | 0.242161 |
| Maximum | 0.600400 | 0.334700 | 0.192177 | 0.611000 | 0.118000 | 0.364000 | 0.934482 | 0.043636 | 0.715921 |
| Minimum | 0.002100 | 0.206400 | 0.044083 | 0.023532 | 0.065000 | 0.028000 | 0.248221 | 0.003901 | 0.028800 |
| Std. Dev. | 0.076295 | 0.024026 | 0.036031 | 0.091342 | 0.014555 | 0.109085 | 0.129682 | 0.006009 | 0.110651 |
| Observations | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |

Note: Non-performing loans (NPLs), Average lending rate (ALR), Capital Adequacy ratio (CAR), Effective tax rate (ETR), Growth domestic product (GDP), Inflation rate (INFR), Loan to Deposit ratio (LTD), Return on asset (ROA) and Return on Equity (ROE)

Source: Financial statements of sample banks, MoFED reports and own computation

NPLs ratio measured by Nonperforming loans divided by total loan ranges from 0.21- 60.04 percent. It has a mean of 5.14 % showing the lowest deviation (2.49%) from its mean value.

This indicates that, from the total loans that Commercial banks in Ethiopia disbursed, an average of 5.14% were being default or uncollected over the sample period. According to Ethiopian context, the banking sectors are required to maintain the ratio of NPLs at least below 5% (NBE, 2008). However, as indicated above in table 4.2, the NPLs of commercial banks in Ethiopia are more than the required threshold. Thus, NPLs problem are still serious for commercial banks in Ethiopia.

Regarding LTD ratio that measured by total loans divided by total deposits, it ranges from a minimum of 24.82% to a maximum of 93.45%. It has a mean of 58.19% with highest deviation (45.22%) from its mean value. As far as profitability ratios concerned, ROA records a minimum of 0.39% and maximum of 4.36 % with a mean value of 2.78 %. In case, even if high ROA indicates better performance in the management of available assets, commercial banks in Ethiopia shows low performance with regard to ROA during the study period as compared to ROE.

On the other hand, ROE measured by the net profit divided by total equity of the bank measures how much the banks are efficiently earning from funds invested by its shareholders. As shown in the above table 4.2, ROE records a minimum of 2.88% and maximum of 71.59% with a mean of value of 24.22%. This implies that commercial banks in Ethiopia have relatively a good performance in terms of ROE as compared to ROA during the study period. Thus, commercial banks in Ethiopia earned high return from its own equity than assets.

CAR also measured by total equity divided by total assets presents a minimum of 4.41% and maximum of 19.22% with a mean value and standard deviation of 12.49 % and 3.6 % respectively. This indicates that CAR for the sample commercial banks in Ethiopia during study period was above the minimum requirement, which is 8%. Furthermore, ALR demonstrates a minimum of 20.64% and maximum of 33.47% with a mean value 27.87 % showing 2.4 % deviations from its mean. In addition, the average real GDP growth in Ethiopia for the last ten years was 0.086 (8.6%), with a standard deviation of 0.045 implies the economic growth in Ethiopia during the sample period remains stable as compared to the inflation rate. Finally, INF ranges from minimum values of 2.8 % to a maximum of 36.40 % with a standard deviation of 0.1091; this implies that inflation rate in Ethiopia during the study period remains somewhat unstable. On the other hand effective tax rate ranges from a minimum of 2.35% to maximum of 61.10 %.

To sum up, LTD ratio had the highest deviation 0.129682 (12.97%) whereas Return on Asset of ECBs had the lowest standard deviation 0.006 (0.6%) of all the variables used in this study. Besides, commercial banks in Ethiopia earned high return from its own equity than assets. Furthermore, average value of NPLs of commercial banks in Ethiopia are above the required threshold (<5%) showing a serious loss from loans whereas CAR are more than the minimum requirement (8%) showing better risk withholding ability of banks as per the National bank of Ethiopia.

4.4 Correlation Analysis

Correlation measures the degree of linear association between variables. Values of the correlation coefficient are always ranged between +1 and -1. A correlation coefficient of +1 indicates that the existence of a perfect positive association between the two variables, while a correlation coefficient of -1 indicates perfect negative association. A correlation coefficient of zero, on the other hand, indicates the absence of relationship (association) between two variables (Brooks, 2008). The table below shows the correlation matrix among dependent and independent variables.

Table 4.3 Correlation Analysis of Variables

| | NPL | ALR | CAR | ETR | GDP | INFR | LTD | ROA | ROE |
|------|-----------|-----------|-----------|----------|----------|----------|-----------|----------|----------|
| NPL | 1.000000 | | | | | | | | |
| ALR | 0.075392 | 1.000000 | | | | | | | |
| CAR | -0.122312 | -0.339579 | 1.000000 | | | | | | |
| ETR | 0.003098 | 0.211183 | -0.120890 | 1.000000 | | | | | |
| GDP | 0.185977 | 0.250554 | -0.153713 | 0.171999 | 1.000000 | | | | |
| INFR | 0.091368 | 0.141415 | -0.099917 | 0.257105 | 0.005208 | 1.000000 | | | |
| LTD | 0.003171 | 0.015701 | 0.349425 | 0.056638 | 0.084067 | 0.005515 | 1.000000 | | |
| ROA | -0.137181 | -0.158128 | 0.237066 | 0.113571 | 0.069378 | 0.271696 | -0.036234 | 1.000000 | |
| ROE | -0.047234 | 0.240734 | -0.693414 | 0.141095 | 0.082492 | 0.183382 | -0.304206 | 0.393287 | 1.000000 |

Source: - form annual report of sample commercial banks computed using E-views 8

The correlation result in Table 4.3 shows capital adequacy ratio, return on asset and return on equity, have negative correlation with nonperforming loans of Ethiopian commercial bank. It refers that when these ratio increases, nonperforming loan of the banks will be go down. However, average lending rate, effective tax rate, growth domestic product, inflation rate, and loan to deposit ratio have positive correlation with nonperforming loans which indicates that while these ratio decreases, at the same time nonperforming loan of the bank will be decrease.

The coefficient estimates of correlation in the above table shows -0.122312, -0.137181, and -0.047234 for capital adequacy ratio, return on asset and return on equity, respectively. This implies

that capital adequacy ratio, return on asset and return on equity are highly negatively correlated with nonperforming loans. However, average lending rate, effective tax rate, growth domestic product, inflation rate, and loan to deposit ratio have 0.075392, 0.003098, 0.185977, 0.091368 and 0.003171 coefficient number respectively which are lower estimate of positive correlation contrast to the above variables.

The result of correlation analysis made in the above table clearly indicates that there is no significant multicollinearity problems among explanatory variables since each of them are not above 0.8 thresholds. As noted by Gujarati (2004), a serious problem for Multicollinearity is occurred if the correlation is about 0.8 or larger.

4.5 Regression model tests

For valid hypothesis testing and to make data available for reliable results, the test of assumption of regression model is required. Accordingly, the study has gone through the most critical regression diagnostic tests consisting of normality, multicollinearity, heteroskedasticity, autocorrelation and model specification tests accordingly.

4.5.1 Model Selection (Random Effect versus Fixed Effect Models)

As Brooks (2008) referring on his book, there are broadly two classes of panel estimator approaches that can be employed in financial research: fixed effects models and random effects models. The choice between both approaches is done by running a Hausman test. To conduct a Hausman test the number of cross section should be greater than the number of coefficients to be estimated. But, in this study the numbers of cross section aren't greater than the number of coefficients to be estimated so it is not possible to conduct a Hausman test. Therefore a fixed cross-sectional effect is specified in the estimation so as to capture unobserved idiosyncratic effects of Ethiopian commercial banks.

4.5.2 Tests for the Classical Linear Regression Model (CLRM) assumptions

To maintain the data validity and robustness of the regressed result of the research, the basic classical linear regression model (CLRM) assumptions must be tested for identifying any misspecification and correcting them so as to augment the research quality (Brooks,2008). There are different CLRM assumptions that need to be satisfied and that are tested in this study, which are: errors equal zero mean test, heteroscedasticity, autocorrelation, normality, multicollinearity and model specification test.

4.5.2.1 The errors have zero mean ($E(u_t) = 0$)

This part shows the test for the assumptions of classical linear regression model (CLRM) namely the error have zero mean, heteroscedasticity, autocorrelation, normality and multicollinearity.

Relay on Brooks (2008), the first assumption required is that the average value of the errors is zero. In fact, if a constant term is included in the regression equation, this assumption will never be violated. Hence, study's regression model has included a constant term, so that this assumption was not violated.

4.5.2.2 Test for Heteroscedasticity assumption ($\text{var}(u_t) = \sigma^2 < \infty$)

As indicated by Brooks (2008), this assumption requires that the variance of the errors to be constant. If the errors do not have a constant variance, it is said that the assumption of homoscedasticity has been violated. This violation is termed as heteroscedasticity. In this study test was used to test for existence of heteroscedasticity across the range of explanatory variables.

H0: The variance of the error is homoscedasticity

H1: The variance of the error is heteroscedasticity

Table 4.4 Heteroskedasticity Test

Heteroskedasticity Test: White

| | | | |
|---------------------|----------|----------------------|--------|
| F-statistic | 0.662607 | Prob. F(11,58) | 0.7672 |
| Obs*R-squared | 7.814637 | Prob. Chi-Square(11) | 0.7298 |
| Scaled explained SS | 8.667590 | Prob. Chi-Square(11) | 0.6525 |

Source: - from annual report of sample commercial banks computed using E-views 8

In this case, both the F- statistic and R-squared versions of the test statistic give the same conclusion that there is no evidence for the presence of heteroscedasticity, since the p-values are considerably in excess of 0.05 and also the third version of the test statistic, 'Scaled explained SS', which as the name suggests is based on a normalized version of the explained sum of squares from the auxiliary regression, suggests also that there is no evidence of heteroscedasticity. Thus, the conclusion of the test has shown that no evidence of heteroscedasticity and the null hypothesis is accepted.

4.5.2.3 Test for autocorrelation assumption ($\text{cov}(u_i, u_j) = 0$ for $i \neq j$)

This assumption stated that the covariance between the error terms over time (or cross sectionals, for that type of data) is zero. In other words, it is assumed that the errors are uncorrelated with one

another. If the errors are not uncorrelated with one another, it would be stated that they are auto correlated or that they are serially correlated (Brooks, 2008).

The study used both Durbin-Watson (DW) and Breusch-Godfrey test for the existence of autocorrelation. In addition, lagged value of a variable (NPL) (-1)) is used in this research in order to adjust the autocorrelation. As per Brooks (2008) lagged the value is simply the value that the variable took during a previous period.

The researcher tested the autocorrelation assumptions that imply zero covariance of error terms over time. That means errors associated with one observation are uncorrelated with the errors of any other observation. As noted by Gujarati (2004), the best renowned test for detecting serial correlation is Durbin Watson test. Accordingly, if the d computed nearest to 2 in application, it is assumed that there is no autocorrelation problem. Thus, as shown in table 4.3, the Durbin-Watson test statistic of the computed “d” in this study was 1.876. So from the regression result DW is 1.876 it is closed to two so that there is no evidence for the presence of autocorrelation. Thus, this implies that error terms are not correlated with one another for different observation in this study and thus the null hypothesis of no autocorrelation neither rejected nor not rejected.

Table 4.5 Autocorrelations test

| | |
|--------------------|--------------|
| Durbin-Watson stat | (1.876488≈2) |
|--------------------|--------------|

Source: Financial statements of banks, MoFED reports and E-views 8computation

Another test for the existence of autocorrelation is by using Breusch-Godfrey test.

H0: The errors are uncorrelated with one another

H1: The errors are correlated with one another

Table 4.6 Breusch-Godfrey Serial Correlation LM Test

| | | | |
|---------------|----------|---------------------|--------|
| F-statistic | 1.298645 | Prob. F(2,58) | 0.2807 |
| Obs*R-squared | 3.000304 | Prob. Chi-Square(2) | 0.2231 |

Source: annual report of sample insurance computed using E-views 8

Both versions of the test; F- statistic and R-squared version of the test indicate that the null hypothesis of no autocorrelation should not be rejected, since the p-values are considerably in excess of 0.05. The conclusion from both versions of the test described that the null hypothesis of no autocorrelation is not rejected.

4.5.2.4 Test of normality ($ut \sim N(0, \sigma^2)$)

As stated by Brooks (2008), if the residuals are normally distributed, the histogram should be bell-shaped and the Bera-Jarque statistic would be significant. This means that Jarque Bera formalizes this by testing the residuals for normality and testing whether the coefficient of skeweness and kurtosis are ≈ 0 and ≈ 3 respectively. Normality assumption of the regression model can be tested with the Jarque- Bera measure. Skewness measures the extent to which a distribution is not symmetric about its mean value and kurtosis measures how it is fat the tails of the distribution. If the Jarque Bera value is greater than 0.05, it's an indicator for the presence of normality (Brooks, 2008).

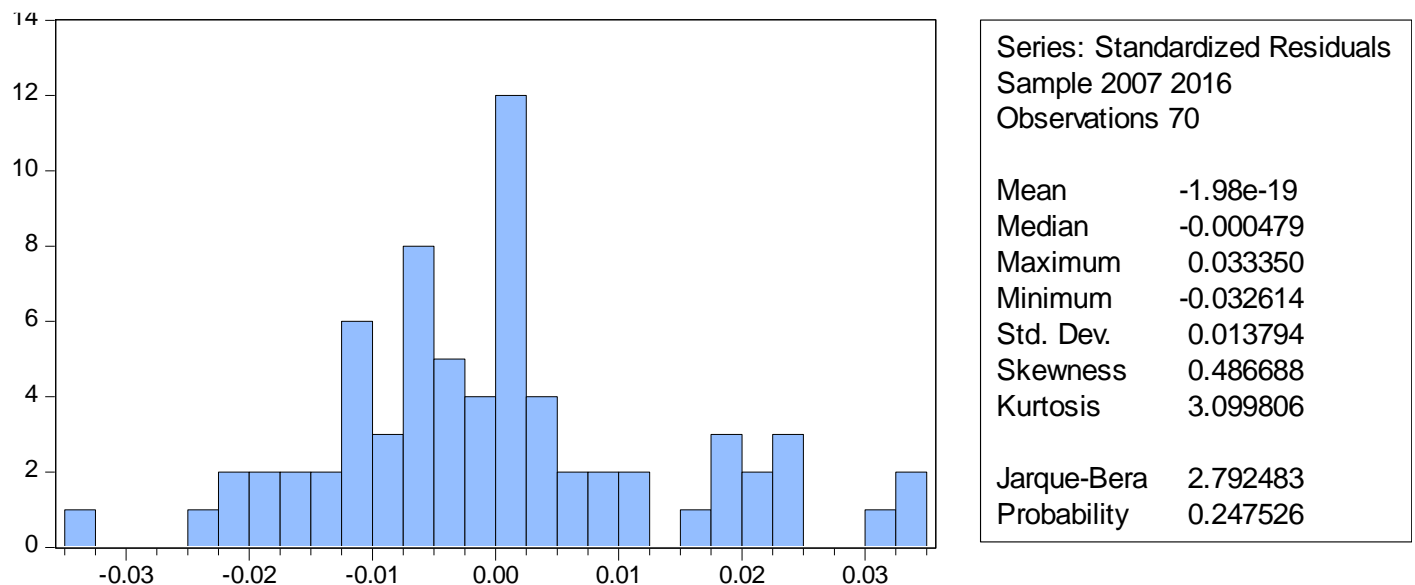
In addition, it is quite often the case that one or two very extreme residuals cause a rejection of the normality assumption. Such observations would appear in the tails of the distribution, which enters into the definition of kurtosis, to be very large. Such observations that do not fit in with the pattern of the remainder of the data are known as outliers. If this is the case, one way to improve the chances of error normality is to use dummy variables (Brooks, 2008). In line with this, the study included three dummy variables (D15, D17 and D1) to adjust the normality distribution. Thus, the figure below shows the result of normality by including three dummy variables.

The hypothesis for the normality test was formulated as follow:

H0: Error term is normally distributed

H1: Error term is not normally distribute

Figure 4.1 Normality Test Result



Source: from annual report of sample commercial banks of Ethiopia computed using E-views 8

As shown in figure 4.1, the coefficient kurtosis (3.1) of the data in this particular study was much closer to 3, and the Bera-Jarque statistic had a P-value of 0.248 implying that there was no evidence for the presence of abnormality in the data. Thus, the null hypothesis that the data is normally distributed should not be rejected since the p-value was considerably in excess of 0.05.

4.5.2.5 Test for Multicollinearity

The term Multicollinearity indicates the existence of exact linear association among some or all explanatory variables in the regression model. When independent variables are multi collinear, there is overlapping or sharing of predictive power. Thus, if multicollinearity is perfect, the regression coefficients of the independent variables are undetermined and their standard errors are immeasurable (Gujarati, 2004). The multicollinearity makes significant variables insignificant by increasing p-value since increased p-value lowers the t-statistics value. Thus, the panel regression results with multicollinearity will shows significant variables as insignificant variables. The multicollinearity problem is solved by dropping highly correlated variables (Ahmad and Bashir, 2013).

As referred by Brooks (2008), an implicit assumption that is made when using the OLS estimation method is that the explanatory variables are not correlated with one another. If there is no relationship between the explanatory variables, they would be said to be orthogonal to one another. However, a problem occurs when the explanatory variables are very highly correlated with each other, and this problem is known as multicollinearity.

Malhotra (2007) stated that multicollinearity problems exists when the correlation coefficient among explanatory variables should be greater than 0.75. However, Brooks (2008) mentioned that if the correlation coefficient along with the independent variables is 0.8 and above, multicollinearity problems will be existed.

Table 4.7 Correlation Matrix between independent variables

| | ALR | CAR | ETR | GDP | INFR | LTD | ROA | ROE |
|------|------------|------------|------------|------------|-------------|------------|------------|------------|
| ALR | 1.000000 | | | | | | | |
| CAR | -0.339579 | 1.000000 | | | | | | |
| ETR | 0.211183 | -0.120890 | 1.000000 | | | | | |
| GDP | 0.250554 | -0.153713 | 0.171999 | 1.000000 | | | | |
| INFR | 0.141415 | -0.099917 | 0.257105 | 0.005208 | 1.000000 | | | |
| LTD | 0.015701 | 0.349425 | 0.056638 | 0.084067 | 0.005515 | 1.000000 | | |
| ROA | -0.158128 | 0.237066 | 0.113571 | 0.069378 | 0.271696 | -0.036234 | 1.000000 | |
| ROE | 0.240734 | -0.693414 | 0.141095 | 0.082492 | 0.183382 | -0.304206 | 0.393287 | 1.000000 |

Source: from annual report of sample commercial banks of Ethiopia computed using E-views 8

The method used in this study to test the existence of multicollinearity was by checking the Pearson correlation between the independent variables. The correlations between the independent variables are shown in table 4.7 above. All correlation results are below 0.75, which indicates that multicollinearity is not a problem for this study.

4.5.2.6 Model Specification test

According to Brooks (2008), further implicit assumption of the classical linear regression model is that the appropriate ‘functional form’ is linear. This means that the appropriate model is assumed to be linear in the parameters and that in the bivariate case, the relationship between dependent and independent can be represented by a straight line. Model specification error occurs when omitting a relevant independent variable and including unnecessary variable.

Therefore, in order to select a correct estimated model, the researcher had carry out the Ramsey-RESET Test to check on the model specification. The hypothesis for the model specification test was formulated as follow;

H0: The model specification is correct.

H1: The model specification is incorrect.

Table 4.8 Result of model specification Test: Ramsey-RESET test

Ramsey RESET Test

Equation: EQ01

Specification: NPL C CAR ETR GDP INFR LTD ROA ROE

Omitted Variables: Squares of fitted values

| | Value | df | Probability |
|------------------|----------|---------|-------------|
| t-statistic | 0.148815 | 61 | 0.8822 |
| F-statistic | 0.022146 | (1, 61) | 0.8822 |
| Likelihood ratio | 0.025409 | 1 | 0.8734 |

Source: from annual report of sample commercial banks of Ethiopia computed using E-views 8

From table 4.8, it can be concluded that this research do not reject null hypothesis (H0), since the p value of f statistic is 0.88, which is greater than significance level of 0.05. Thus, it can be concluded that the model specification is correct from year 2007 to 2016. Overall reliability and validity of the model was enhanced further by the Prob (F-statistic) value of 0.000000.

4.6 Analysis of regression and interview result

This section presents the empirical findings from the econometric output and interview results that made to examine the determinants of nonperforming loans of commercial banks in Ethiopia..

Accordingly, the regression result was made and coefficients of the variables were estimated via e-view version 8 software. As stated earlier in model selection part, fixed effect regression model is an appropriate model used in this study.

Table 4.9 below reports regression results between the dependent variable (NPL) and explanatory variables

4.6.1. Regression result

Empirical model: the empirical model used to examine the determinants of NPLs of commercial banks in Ethiopia in this study was:-

$$NPL_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 ETR_{it} + \beta_3 INFR_{it} + \beta_4 ALR_{it} + \beta_5 LTD_{it} + \beta_6 ROA_{it} + \beta_7 ROE_{it} + \beta_8 GDP_{it} + \varepsilon$$

Source: developed by the researcher

Table 4.9 Regression result

Dependent Variable: NPL

Method: Panel Least Squares

Date: 01/09/18 Time: 15:18

Sample: 2007 2016

Periods included: 10

Cross-sections included: 7

Total panel (balanced) observations: 70

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|-----------|
| C | -0.053363 | 0.050470 | -1.057321 | 0.2956 |
| ALR | 0.442270 | 0.115897 | 3.816066 | 0.0004*** |
| CAR | -0.876317 | 0.225457 | -3.886846 | 0.0003*** |
| ETR | 0.022615 | 0.032658 | 0.692463 | 0.4919* |
| GDP | 0.367862 | 0.162626 | 2.262009 | 0.0282** |
| INFR | 0.066412 | 0.022162 | 2.996628 | 0.0043*** |
| LTD | 0.064998 | 0.022782 | 2.852994 | 0.0063*** |
| ROA | -1.661817 | 0.825860 | 2.012225 | 0.0497** |
| ROE | -0.249454 | 0.062379 | -3.999012 | 0.0002*** |
| DUM213 | 0.573320 | 0.017980 | 31.88631 | 0.0000*** |
| DUM107 | 0.108164 | 0.021248 | 5.090492 | 0.0000*** |
| DUM409 | 0.067284 | 0.018264 | 3.683869 | 0.0006*** |

Effects Specification

Cross-section fixed (dummy variables)

| | | | |
|--------------------|----------|-----------------------|-----------|
| R-squared | 0.967310 | Mean dependent var | 0.051408 |
| Adjusted R-squared | 0.953967 | S.D. dependent var | 0.076295 |
| S.E. of regression | 0.016369 | Akaike info criterion | -5.143486 |
| Sum squared resid | 0.013130 | Schwarz criterion | -4.468938 |
| Log likelihood | 201.0220 | Hannan-Quinn criter. | -4.875547 |
| F-statistic | 72.49545 | Durbin-Watson stat | 1.912422 |
| Prob(F-statistic) | 0.000000 | | |

*Note: ***significant at 1%, **significant at 5%, and * insignificant H* accept null and H** reject null hypothesis*

Thus, based on the result in above Table, the following model was developed to examine the determinant of NPL on Ethiopian commercial banks.

$$\text{NPL} = -0.053363 + 0.442270 \text{ALR} - 0.876317 \text{CAR} + 0.022615 \text{ETR} + 0.367862 \text{GDP} + 0.066412 \text{INFR} + 0.064998 \text{LTD} - 1.661817 \text{ROA} - 0.249454 \text{ROE} + \text{DUM213} + \text{DUM107} + \text{DUM409} + \varepsilon$$

This section discusses in detail the analysis of the results for each explanatory variable and their effect on nonperforming loans of Ethiopian commercial banks. Furthermore, the discussion

analyzed the statistical findings of the study in relation to the previous empirical evidences. Hence, the following discussions present the interpretation on the fixed effects model regression results.

P-value indicates at what percentage or precession level of each variable is significant. The R-squared value measures how well the regression model explains the actual variations in the dependent variable (Brooks, 2008). R-squared statistics and the adjusted- R squared statistics of the model was 96.73 % and 95.40 % respectively. The adjusted R^2 value 95.40 % indicates that the dependent variable of Nonperforming loan (NPL) of Ethiopian commercial banks is well explained by the independent variables that are listed in the model. Thus, these variables collectively are good explanatory variables to identify the nonperforming loans of Ethiopian commercial banks. The regression F-statistic (72.49545) and the p-value of zero attached to the test statistic reveal that the null hypothesis that all of the coefficients are jointly zero should be rejected. Thus, it implies that the independent variables in the model were able to explain variations in the dependent variable.

Furthermore, the researcher examined the impact of both bank specific and macroeconomic factor on the level of NPLs based on regression result of fixed Effect Model in the above table 4.3 in terms of examination of coefficients of explanatory variables and significance level. Through the examination of coefficients for bank specific factors as shown in table 4.7, the coefficient estimate of capital adequacy ratio and financial performance of a bank (ROE) were negative and statistically significant at 1% significance level. The coefficient estimates of the aforementioned independent variables were -0.876317 & -0.249454 respectively. The negative sign of the coefficient estimate with 1% significant level indicate the existence of strong inverse relationship between NPLs and the above mentioned independent variables. Thus, it can be concluded that, an increase on those variables lead to a decrease in NPLs of Ethiopian commercial banks. In addition, the coefficient estimate of the financial performance of a bank (ROA) was negative and statistically significant at 5% significance level. The magnitude of the coefficient estimate variable of ROA was (-1.661817). On the other hand, the coefficient estimate of average lending rate, inflation rate and loan to deposit ratio were positive and statistically significant at 1% significance level. The coefficient estimates of the above independent variables were 0.442270, 0.066412, & 0.064998 respectively. The positive sign of the coefficient estimate with 1% significant level indicate the existence of strong direct relationship between NPLs and the above mentioned independent variables. Thus, it can be

concluded that, an increase on those variables lead to an increase in NPLs of Ethiopian commercial banks.

Beside, the coefficient for real growth domestic product was 0.367862 on NPL which refers that real growth domestic product had positive and significant relation with NPL at 5% level of significant.

However, the results of t - statistics for effective tax rate was insignificant since the p-value was considerably in excess of 10%.

The negative relationship indicates that there is an inverse relationship between the independent variables and NPL. Thus, increasing of those variables will lead to a decrease in NPL of Ethiopian commercial banks. On the other hand the positive relationships indicate that there is a direct relationship between the independent variables and NPL. Increasing/Decreasing of this variable will led to an increment or a decline in NPL Commercial banks of Ethiopia.

Hence, based on the above results it can be conclude that, both bank-specific (Return on asset, Return on equity, Capital adequacy ratio and loan to deposit ratio) and macroeconomic (real GDP growth, inflation and average lending rate) variables were the determinants of NPLs in Ethiopian commercial banks.

4.2.2. In-depth interview results

As mentioned in the previous chapter the purpose of qualitative research approach in this particular study was to supplement the data obtained from structured review of documents and to investigate other factors that could not obtained from documents. Accordingly, in supplement to the structured review of financial records, this study employed unstructured in-depth interviews. In depth interviews were conducted with five sampled commercial banks unstructured interview with seven senior banks credit department employees (credit department manager and senior credit committee members and credit follow up and monitoring managers) was conducted. The interviewees were from all the sampled commercial banks of Ethiopia who had more than 10 years credit experience in banking industry. All the interviewees were interviewed independently at different times.

The interview questions were fully unstructured and focused on the identification of factors that affecting the NPLs of Ethiopian Commercial banks in general. In addition, the interview questions tried to identify how those factors can influence NPLs of ECBs, the major determining factors among the influential factors and their general opinion regarding the matter. As per the interview

results, the general reasons which lead to the emergence of NPLs in ECBs can be grouped into the following three major categories:

The internal factors, the bank-specific determinants of nonperforming loans included in the study variables that can be influenced by managerial decisions of a bank such as return on asset, return on equity and capital adequacy ratio. As per the interviews, performance and operational efficiency of banks have a negative association with NPLs of Ethiopian Commercial Banks. On the other hand, loan to deposit ratio of a bank has positive relationships with the volume of NPLs.

Besides, related to the external factors include variables such as macro-economic variables (real GDP growth, inflation, average lending rate and effective tax rate), the international conditions, government regulation and the surrounding natural environment. All the above external factors can adversely or positively affect the loan quality of Ethiopian Commercial Banks. Under the macroeconomic conditions inflation, effective tax rate, lending rate and real GDP growth had a negative association with the volume of NPLs in Ethiopian Commercial Banks.

4.7 Discussion of Regression and interview Result

Based on previous studies and the finding of this study, this section discussed the general result obtained via Fixed Effect regression Model as shown in the above table 4.9. Referring the literature, the result of each explanatory variable including their impact on the level of NPLs of commercial banks in Ethiopia was discussed. Thus, result of the finding was discussed in relation to the previous empirical and theoretical evidences.

4.7.1 Determinants of Nonperforming Loans

Thus, taking into consideration that the basic aim of this study was to examine the determinants of NPLs of commercial banks in Ethiopia, the estimation results of Fixed Effect Model that presents the impact of explanatory variables on NPLs were discussed as follows:

Return on Asset (ROA)

The coefficient estimate of banks financial performance (measured by the ratio of ROA) revealed negative and statistically significant association with NPLs. The magnitude of the coefficient estimate (-1.661817) for ROA was the largest of all the variables used in the model. This indicates that, ROA had a great impact in explaining the variation of NPLs in ECBs. Moreover, the coefficient estimate was statistically significant at 1% and 5% significant level (p-value of 0.0497).

This implies that, an increase in the ratio of bank's ROA, leads to a decrease in NPLs of ECBs. The finding was in consistent with prior expectation and theory that indicated profitable banks are less

engaged in risky activities as they have less pressure to create revenues and ultimately resulted with lower volume of NPLs (Kwan and Eisenbeis, 1995; Berger and DeYoung, 1997; Barth et al., 2002). In this general setting, it can be concluded that, as the financial performance (profitability) of Ethiopian banks increase, the likelihood that banks engaged in risky activities would be reduced and ultimately the probability that loans became NPLs will reduce with the same manner. Therefore, the findings suggested that, financial performance (profitability) of banks was a vital determinant of NPLs in ECBs. This finding was also consistent with the previous study of Hu et al. (2004), Godlewski (2004), Jellouli et al (2009), Metaxas et al (2010) and Zelalem Tsgie et al (2013). Similarly, the result obtained from interview supports the regression output. This is due to the fact that, the financial performance of Ethiopian banks determines the risk taking behavior of managers.

Return on Equity (ROE)

The results of fixed effect model in the above table 4.3 indicate that there is a negative and statistically significant impact of ROE on the level of NPLs. The result shows strong effect of bank profitability measured in terms of ROE on NPLs with a coefficient of -0.249454 and a p-value of 0.0002 at 1% significance level. This implies that for one unit change in ROE, keeping the other things constant had resulted 0.25 unit change on the level of NPLs in opposite direction. This result confirms the finding of Makri *et al.* (2014) and Boudriga *et al.*(2009) where aggregate country data was used, Klein (2013), Shingjerji (2013), Ahmad and Bashir(2013) and Hyun and Zhang(2012) where particular country data was used.

Contrary to the finding of Gadisse Gezu *et al* (2014), and Louzis *et al.* (2012) where particular country data was used, this result, as expected, indicates a negative significant effect of ROE on the levels of NPLs of commercial banks in Ethiopia. This implies that deterioration of profitability ratio in terms of ROE leads to higher NPLs. This negative significant impact of ROE on the levels of NPLs indicates the existence of better management of funds invested by shareholders via good agency relationships in commercial banks in Ethiopia.

Inflation rate

As mentioned in the literature review part, inflation affects borrowers' debt servicing capacity through different channels and its impact on NPL can be positive or negative. Higher inflation rate can make borrowers debt servicing easier by reducing their real value of outstanding loans. However, it can also weaken some borrowers' ability to service debt by reducing their real income. Nevertheless, in this study the coefficient estimate of inflation was positive and statistically

significant at 1% significant level (P- value of 0.0043). The positive coefficient estimate of inflation (0.066412) indicates a strong direct association with NPLs. That means an increase in inflation rate; lead an increase in NPLs. This result was consistent with the findings of Fofack (2005), Pasha and Khemraj (2009), Louzis et al. (2010) and Azeem et al. (2012). As the existing theories suggested this relationships appeared in the banking system where the lending rate is not adjusted to the inflation change.

Correspondingly, the result obtained from interview revealed the fact that in Ethiopia banking system, inflation was one of the major factors that can affect NPLs of ECBs negatively.

Capital Adequacy Ratio (CAR)

Regarding capital adequacy ratio that determines the risk taking behavior of banks, this study identifies statistically significant at 1% significant level and negative impact of capital adequacy ratio on NPLs. Thus, regression result of fixed effect model in the above table 4.3 is consistent with the hypothesis developed in this study. The study hypothesized that there is a negative association between CAR and NPLs of banks. This negative sign indicates an inverse relationship between capital adequacy ratio and NPLs. Thus, it implies that for one unit change in the banks' capital adequacy ratio, keeping other thing constant had resulted 0.88 unit changes on the levels of NPLs in opposite direction. The result of this finding is consistent with the study of Hyun and Zhang (2012) where particular country data was used and Makri *et al.* (2014) where aggregate country data was used. Unlike the study made by Boudriga *et al.* (2009), and Djiogap and Ngomsi (2012) where aggregate country data was used and, Shingjerji (2013) and Swamy (2012) where particular country data was used, the result of this finding confirms significant negative effect of CAR on the levels of NPLs of commercial banks in Ethiopia by supporting the arguments that state well capitalized banks are better able to resist the levels of risk. This implies commercial banks in Ethiopia are less the incentives to take riskier loan activities due to highly regulated nature of the institution in the country. Thus, negative impact of CAR on NPLs is due to effective regulatory pressures by NBE on capital adequacy ratio of banks and also bank managements' efficient utilization of its capital to absorb NPLs.

Average Lending Rate

The coefficient estimate of real interest rate (measured by the average lending rate of Ethiopian Commercial Banks) was positive which was in accordance with prior expectation and theory (Sinkey and Greenwalt, 1991; Fofack, 2005; Jimenez and Saurina, 2005). This implies that an increase in the

average lending rate of Ethiopian Commercial Banks, ultimately increase the size of their NPLs. That means as interest rates rise, prudent borrowers are more likely to decide that it would be unwise to borrow, whereas borrowers with the riskiest investment projects are often those who are willing to pay the highest interest rates. Hence, higher interest rate leads to greater adverse selection that increases the likelihood that the lender is lending to a bad credit risk which ultimately increases the volume of banks NPLs. However, the magnitude of the coefficient estimate (0.442270) was indicates that, the average lending rate of Ethiopian Commercial Banks had an impact in explaining the variation of NPLs in Ethiopia banks.

In addition, the coefficient estimate of average interest rate was statistically significant at 1% significant level with the p-value (0.0004). Hence, the findings suggested that, there was a positive significant association among real interest rate and bank's NPLs in Ethiopian Commercial Banks.

Similarly, the result generated from the interview supported the output of the regression analysis fully. As per the interview conducted with credit manager and senior credit committee members of Ethiopian Commercial Banks, Average interest rate was not considered as the determinate of NPLs since banks are not allowed to make any adjustment on their lending rate so as to compensate losses from the existing high inflationary rate.

The finding was inconsistence with the result of (Swamy, 2012; De Bock and Demyanets, 2012; Azeem et al., 2012; Castro, 2012).

4.8 Summary

This chapter discussed the results of documentary analysis regarding the determinant factors of nonperforming loans of commercial bank in Ethiopia. In case, trends of NPLs of commercial banks, descriptive statistics, and some diagnostic tests for classical linear regression model assumptions was presented. From descriptive statistics, the levels of NPLs of commercial banks in Ethiopia are still above the threshold. i.e. more than 5 %. Besides, Commercial banks in Ethiopia earn high return from funds invested by the shareholders rather than from its assets. To this end, normality, heteroscedasticity, multicollinearity and autocorrelation problem was checked. Eventually, the result shows that capital adequacy/solvency ratio, bank profitability measured in terms of ROA and ROE, loan to deposit ratio, lending rate, inflation rate and gross domestic product were statistically significant factors that determine the NPLs of commercial banks in Ethiopia. However, the result did not support the significant effect of effective tax rate.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

Summary; the previous chapter presented descriptive analysis and examined the trends of NPLs of commercial banks in Ethiopia. Besides, the results of findings and discussion were also made as well. This chapter summarizes the findings of the study. Accordingly, the first section is the conclusion part that presents a brief summary for the finding of the study. Lastly, the second section reveals the recommendation for the finding whereas section three highlights the direction for further studies.

5.1 Conclusion

NPLs are serious problem that need to be accorded careful attention. A loan is identified and segregated as non-performing depending on the number of days a repayment is delayed or discontinued. According to National Bank of Ethiopia's Directive No SBB/43/2008 Asset Classification and Provisioning Directive, *Non-performing* means loans or advances whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with contractual repayment terms of the loans or advances is due and uncollected for 90 (ninety) consecutive days or more beyond the scheduled payment date or maturity.

The main objective of this study was to examine the determinants of nonperforming loans (NPLs) of commercial banks in Ethiopia based on panel data analysis on the time period from 2007 to 2016. The data was analyzed by using Fixed Effect Model.

The study found out that return on asset, return on equity, capital adequacy ratio, lending rate, loan to deposit ratio and inflation rate had statistically significant effect on the level of NPLs. However, the results of fixed effect regression model revealed the insignificant effect of effective tax rate and on the level of NPLs of commercial banks in Ethiopia for the period under consideration.

On the other hand, the findings indicated that bank profitability measured in terms of return on asset and return on equity had negative and statistically significant effect on the levels of NPLs. This implies effective management of commercial banks in Ethiopia on utilization of both its asset and funds contributed by shareholders.

Similarly, the study also found out that capital adequacy ratio has negative and statistically significant impact on NPLs of commercial banks in Ethiopia. This indicates banks with strong

capital adequacy have a tendency to absorb possible loan losses and thus, reduce the level of NPLs due to efficient utilization of its capital.

The finding of Inflation rate, average lending rate and gross domestic product are a factor that has positive impact on the levels of NPLs of commercial banks in Ethiopia as per the regression result in this study.

Furthermore, the result of effective tax rate did not support an important association with NPLs reported by Ethiopian banks. In fact, the result of effective tax rate showed a positive value is in excess of the acceptable significant level. Hence, effective tax rate was not found to be important determinants of NPLs in Ethiopia commercial banks.

Finally, as the interview suggested, other internal factors such as absence of adequate man power, lack of comprehensive studies on the credit applicants, lack of follow-up on the borrower's activities or failure to follow up the collateral provided by the borrowers were also the major internal determinants of NPLs in Ethiopian Commercial banks. In addition, factors related to the borrowers such as providing false information to the bank, using the loan for other purposes that are undesirable from the banks' point of view (fund diversion), willful default and operational losses of borrower were also the determinants of NPLs in Ethiopian Commercial Banks. Moreover, external variables such as the international conditions (competition), government regulation, and the surrounding natural environment were also affecting the NPLs of Ethiopian Commercial banks.

5.2 Recommendation

Based on the findings of the regression analysis and conclusion, the following recommendations were forwarded.

The performance of a business organization is measured in its profitability and efficient management. The greater extent of its success depends on the efficient management of its financial resources. Thus management of finance in credit area is a very sensitive and complex issue in the operation of banks where one should be well aware of minimizing risk in the course of administering loans and advances. As deposits of banks are usually payable on demand or on a short notice, banks should also limit the time for which loans are granted and ensure that they are repaid within that period of time. Lending banks should be aware of the dangers involved in maintaining bad loans in their books of accounts and make advance preparations as to how disbursed loans should be collected timely. Collection plans are not to be initiated after approval or disbursement. It has frequently been said that a good banker collects a loan at the time of its disbursement; meaning

- a loan properly analyzed and scheduled at the outset is virtually self-servicing. Administration of loans involves the entire process starting from credit application to final resolution. Therefore, lending banks need to develop and put in place prudent credit processing, encompassing appropriate exercise of KYC for proper customer selection and assessment of credit worthiness of borrowers. Robust credit analysis from the point of view of what contribution the loan will yield to the customer's business, to the bank's income/profit as well as to the overall economic development of the country needs to be accorded earnest concern of the pertinent stakeholders.

Direction for Further Research

This study examined both bank specific and macroeconomic determinants of nonperforming loans of senior commercial banks in Ethiopia using selected variables. However, there are so many variables that were not included in this study. Thus, future researchers may be interested in validating the consistency of the result and provide supplementary results for this study by including other variables like effective exchange rate, size, ownership, unemployment rate and the like on the same banks. Furthermore, the same study may be required on newly emerging banks.

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APPENDICES

Appendix 1:-Descriptive Analysis

| | NPL | ALR | CAR | ETR | GDP | INFR | LTD | ROA | ROE |
|--------------|----------|-----------|-----------|----------|-----------|----------|----------|-----------|----------|
| Mean | 0.051408 | 0.278703 | 0.124944 | 0.289891 | 0.100300 | 0.171500 | 0.581900 | 0.027808 | 0.242161 |
| Median | 0.033900 | 0.280000 | 0.118434 | 0.272919 | 0.102500 | 0.146500 | 0.562560 | 0.027795 | 0.224250 |
| Maximum | 0.600400 | 0.334700 | 0.192177 | 0.611000 | 0.118000 | 0.364000 | 0.934482 | 0.043636 | 0.715921 |
| Minimum | 0.002100 | 0.206400 | 0.044083 | 0.023532 | 0.065000 | 0.028000 | 0.248221 | 0.003901 | 0.028800 |
| Std. Dev. | 0.076295 | 0.024026 | 0.036031 | 0.091342 | 0.014555 | 0.109085 | 0.129682 | 0.006009 | 0.110651 |
| Skewness | 5.519279 | -0.116530 | -0.041955 | 1.620143 | -1.211343 | 0.593580 | 0.026625 | -0.605321 | 2.182067 |
| Kurtosis | 39.61278 | 2.914411 | 2.475443 | 7.223726 | 3.982426 | 2.068693 | 3.734425 | 5.774436 | 9.889200 |
| | | | | | | | | | |
| Jarque-Bera | 4265.175 | 0.179791 | 0.823086 | 82.65635 | 19.93415 | 6.640318 | 1.581462 | 26.72586 | 193.9780 |
| Probability | 0.000000 | 0.914027 | 0.662627 | 0.000000 | 0.000047 | 0.036147 | 0.453513 | 0.000002 | 0.000000 |
| | | | | | | | | | |
| Sum | 3.598540 | 19.50920 | 8.746057 | 20.29237 | 7.021000 | 12.00500 | 40.73300 | 1.946577 | 16.95127 |
| Sum Sq. Dev. | 0.401641 | 0.039829 | 0.089580 | 0.575686 | 0.014617 | 0.821076 | 1.160396 | 0.002492 | 0.844818 |
| | | | | | | | | | |
| Observations | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |

Appendix 2:-Test of Heteroskedasticity

Heteroskedasticity Test: White

| | | | |
|---------------------|----------|----------------------|--------|
| F-statistic | 0.662607 | Prob. F(11,58) | 0.7672 |
| Obs*R-squared | 7.814637 | Prob. Chi-Square(11) | 0.7298 |
| Scaled explained SS | 8.667590 | Prob. Chi-Square(11) | 0.6525 |

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 01/09/18 Time: 15:29

Sample: 1 70

Included observations: 70

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|-----------|
| C | 0.000762 | 0.000592 | 1.288691 | 0.2026 |
| CAR^2 | 0.001381 | 0.017760 | 0.077734 | 0.9383 |
| ETR^2 | -0.000493 | 0.001608 | -0.306497 | 0.7603 |
| GDP^2 | 0.023488 | 0.045338 | 0.518073 | 0.6064 |
| INFR^2 | 0.005156 | 0.002672 | 1.929586 | 0.0586 |
| LTD^2 | -0.000830 | 0.000826 | -1.004498 | 0.3193 |
| ROA^2 | -0.352804 | 0.449604 | -0.784701 | 0.4358 |
| ROE^2 | -0.001583 | 0.001720 | -0.920529 | 0.3611 |
| DUM15^2 | -0.000664 | 0.000923 | -0.719240 | 0.4749 |
| DUM17^2 | -0.000515 | 0.000880 | -0.585186 | 0.5607 |
| DUM1^2 | -0.000939 | 0.000952 | -0.986316 | 0.3281 |
| R-squared | 0.111638 | Mean dependent var | | 0.000466 |
| Adjusted R-squared | -0.056845 | S.D. dependent var | | 0.000843 |
| S.E. of regression | 0.000867 | Akaike info criterion | | -11.10906 |
| Sum squared resid | 4.36E-05 | Schwarz criterion | | -10.72360 |
| Log likelihood | 400.8170 | Hannan-Quinn criter. | | -10.95595 |
| F-statistic | 0.662607 | Durbin-Watson stat | | 1.662962 |
| Prob(F-statistic) | 0.767191 | | | |

Appendix 3: - Test of autocorrelation

Breusch-Godfrey Serial Correlation LM Test:

| | | | |
|---------------|----------|---------------------|--------|
| F-statistic | 1.298645 | Prob. F(2,58) | 0.2807 |
| Obs*R-squared | 3.000304 | Prob. Chi-Square(2) | 0.2231 |

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 01/09/18 Time: 15:27

Sample: 1 70

Included observations: 70

Presample missing value lagged residuals set to zero.

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|-----------|-------------|------------|-------------|--------|
| C | 0.012010 | 0.044820 | 0.267967 | 0.7897 |
| CAR | 0.021211 | 0.258458 | 0.082068 | 0.9349 |
| ETR | 0.006224 | 0.043159 | 0.144201 | 0.8858 |
| GDP | -0.147622 | 0.298450 | -0.494629 | 0.6227 |
| INFR | -0.018005 | 0.041114 | -0.437923 | 0.6631 |
| LTD | 0.010462 | 0.033803 | 0.309483 | 0.7581 |
| ROA | -0.264320 | 1.186869 | -0.222704 | 0.8245 |
| ROE | 0.010960 | 0.085761 | 0.127801 | 0.8987 |
| DUM15 | 0.003616 | 0.033074 | 0.109322 | 0.9133 |
| DUM17 | 0.002574 | 0.031314 | 0.082206 | 0.9348 |
| RESID(-1) | 0.172187 | 0.153081 | 1.124811 | 0.2653 |
| RESID(-2) | 0.141978 | 0.155127 | 0.915235 | 0.3639 |

| | | | |
|--------------------|-----------|-----------------------|-----------|
| R-squared | 0.042861 | Mean dependent var | 2.05E-17 |
| Adjusted R-squared | -0.138665 | S.D. dependent var | 0.028785 |
| S.E. of regression | 0.030716 | Akaike info criterion | -3.973250 |
| Sum squared resid | 0.054722 | Schwarz criterion | -3.587794 |
| Log likelihood | 151.0638 | Hannan-Quinn criter. | -3.820142 |
| F-statistic | 0.236117 | Durbin-Watson stat | 1.876488 |
| Prob(F-statistic) | 0.993797 | | |

Appendix 4:- Model Specification test

Ramsey RESET Test

Equation: EQ01

Specification: NPL C CAR ETR GDP INFR LTD ROA ROE

Omitted Variables: Squares of fitted values

| | Value | df | Probability |
|------------------|----------|---------|-------------|
| t-statistic | 0.148815 | 61 | 0.8822 |
| F-statistic | 0.022146 | (1, 61) | 0.8822 |
| Likelihood ratio | 0.025409 | 1 | 0.8734 |

F-test summary:

| | Sum of Sq. | df | Mean Squares |
|------------------|------------|----|--------------|
| Test SSR | 0.000132 | 1 | 0.000132 |
| Restricted SSR | 0.365084 | 62 | 0.005888 |
| Unrestricted SSR | 0.364952 | 61 | 0.005983 |
| Unrestricted SSR | 0.364952 | 61 | 0.005983 |

LR test summary:

| | Value | df |
|-------------------|----------|----|
| Restricted LogL | 84.63861 | 62 |
| Unrestricted LogL | 84.65131 | 61 |

Unrestricted Test Equation:

Dependent Variable: NPL

Method: Least Squares

Date: 01/09/18 Time: 15:31

Sample: 1 70

Included observations: 70

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|----------|-------------|------------|-------------|--------|
| C | 0.058581 | 0.145031 | 0.403921 | 0.6877 |
| CAR | -0.438251 | 0.888162 | -0.493436 | 0.6235 |
| ETR | -0.040105 | 0.130637 | -0.306996 | 0.7599 |
| GDP | 0.744397 | 1.472998 | 0.505362 | 0.6151 |
| INFR | 0.067405 | 0.191950 | 0.351162 | 0.7267 |
| LTD | -0.001315 | 0.079285 | -0.016582 | 0.9868 |
| ROA | 0.030804 | 3.614551 | 0.008522 | 0.9932 |
| ROE | -0.139452 | 0.278134 | -0.501385 | 0.6179 |
| FITTED^2 | 2.105731 | 14.15001 | 0.148815 | 0.8822 |

| | | | |
|--------------------|-----------|-----------------------|-----------|
| R-squared | 0.091350 | Mean dependent var | 0.051408 |
| Adjusted R-squared | -0.027818 | S.D. dependent var | 0.076295 |
| S.E. of regression | 0.077349 | Akaike info criterion | -2.161466 |
| Sum squared resid | 0.364952 | Schwarz criterion | -1.872374 |
| Log likelihood | 84.65131 | Hannan-Quinn criter. | -2.046635 |
| F-statistic | 0.766567 | Durbin-Watson stat | 2.081503 |
| Prob(F-statistic) | 0.633250 | | |

NB. CAPITA ADIQUACY RATIO, EFFECTIVE TAX RATE, INFLATION RATE, LENDING INTEREST RATE LOAN TO DEPOSIT RATIO, RETURN ON ASSET, RETURN ON EQUITY, GROSS DOMESTIC PRODUCT.

Appendix5: - Raw data used for analysis

| | Name of Banks | Year | NPL | CAR | ETR | INFR | ALR | LTD | GDP | ROA | ROE |
|---|---------------|------|--------|----------|----------|-------|--------|----------|-------|----------|----------|
| 1 | CBE | 2007 | 0.1452 | 0.097269 | 0.261338 | 0.158 | 0.26 | 0.248221 | 0.12 | 0.019972 | 0.205329 |
| 1 | CBE | 2008 | 0.0533 | 0.090588 | 0.271248 | 0.253 | 0.27 | 0.440615 | 0.11 | 0.027065 | 0.298775 |
| 1 | CBE | 2009 | 0.0366 | 0.084846 | 0.292567 | 0.364 | 0.29 | 0.432413 | 0.1 | 0.032388 | 0.381731 |
| 1 | CBE | 2010 | 0.1484 | 0.074578 | 0.298931 | 0.028 | 0.3 | 0.405424 | 0.1 | 0.026537 | 0.355824 |
| 1 | CBE | 2011 | 0.0086 | 0.054571 | 0.324344 | 0.181 | 0.32 | 0.391628 | 0.11 | 0.02506 | 0.309223 |
| 1 | CBE | 2012 | 0.02 | 0.048007 | 0.314873 | 0.341 | 0.31 | 0.486636 | 0.087 | 0.034369 | 0.715921 |
| 1 | CBE | 2013 | 0.0099 | 0.047041 | 0.31482 | 0.135 | 0.32 | 0.440662 | 0.1 | 0.030014 | 0.638046 |
| 1 | CBE | 2014 | 0.034 | 0.044083 | 0.315499 | 0.081 | 0.3 | 0.451819 | 0.1 | 0.027315 | 0.619636 |
| 1 | CBE | 2015 | 0.038 | 0.163278 | 0.241222 | 0.077 | 0.31 | 0.4878 | 0.1 | 0.0159 | 0.0288 |
| 1 | CBE | 2016 | 0.041 | 0.153122 | 0.223183 | 0.097 | 0.32 | 0.549577 | 0.07 | 0.02592 | 0.169275 |
| 2 | AIB | 2007 | 0.0736 | 0.092792 | 0.290196 | 0.158 | 0.299 | 0.845451 | 0.12 | 0.025839 | 0.27846 |
| 2 | AIB | 2008 | 0.0866 | 0.100883 | 0.293766 | 0.253 | 0.3 | 0.684898 | 0.11 | 0.026478 | 0.262466 |
| 2 | AIB | 2009 | 0.0578 | 0.106736 | 0.294403 | 0.364 | 0.2938 | 0.483623 | 0.1 | 0.029982 | 0.280894 |
| 2 | AIB | 2010 | 0.0547 | 0.106323 | 0.294377 | 0.028 | 0.3004 | 0.696431 | 0.1 | 0.027436 | 0.258048 |
| 2 | AIB | 2011 | 0.14 | 0.12052 | 0.28598 | 0.181 | 0.286 | 0.277535 | 0.11 | 0.03252 | 0.269832 |
| 2 | AIB | 2012 | 0.027 | 0.12576 | 0.256646 | 0.341 | 0.2566 | 0.559956 | 0.087 | 0.030051 | 0.238953 |
| 2 | AIB | 2013 | 0.6004 | 0.116185 | 0.247694 | 0.135 | 0.2477 | 0.574775 | 0.1 | 0.024663 | 0.212276 |
| 2 | AIB | 2014 | 0.029 | 0.117475 | 0.254027 | 0.081 | 0.2682 | 0.556378 | 0.1 | 0.027968 | 0.238075 |
| 2 | AIB | 2015 | 0.032 | 0.129469 | 0.250671 | 0.077 | 0.2941 | 0.662241 | 0.1 | 0.027036 | 0.208822 |
| 2 | AIB | 2016 | 0.033 | 0.128861 | 0.245656 | 0.097 | 0.2527 | 0.666391 | 0.07 | 0.025119 | 0.194931 |
| 3 | DB | 2007 | 0.0595 | 0.090131 | 0.27459 | 0.158 | 0.2752 | 0.800116 | 0.12 | 0.031119 | 0.345267 |
| 3 | DB | 2008 | 0.0589 | 0.093192 | 0.281189 | 0.253 | 0.2812 | 0.697666 | 0.11 | 0.030492 | 0.327199 |
| 3 | DB | 2009 | 0.0739 | 0.093366 | 0.291107 | 0.364 | 0.2911 | 0.548787 | 0.1 | 0.025674 | 0.274984 |
| 3 | DB | 2010 | 0.03 | 0.090934 | 0.292887 | 0.028 | 0.2929 | 0.486836 | 0.1 | 0.026231 | 0.288457 |
| 3 | DB | 2011 | 0.0338 | 0.095547 | 0.284536 | 0.181 | 0.2845 | 0.514631 | 0.11 | 0.030836 | 0.322726 |
| 3 | DB | 2012 | 0.0215 | 0.104332 | 0.270078 | 0.341 | 0.2701 | 0.565164 | 0.087 | 0.037215 | 0.356701 |
| 3 | DB | 2013 | 0.0225 | 0.103595 | 0.253622 | 0.135 | 0.2536 | 0.546534 | 0.1 | 0.030726 | 0.296601 |
| 3 | DB | 2014 | 0.0068 | 0.118277 | 0.255961 | 0.081 | 0.2463 | 0.533309 | 0.1 | 0.032441 | 0.274283 |
| 3 | DB | 2015 | 0.0063 | 0.118071 | 0.243487 | 0.077 | 0.2652 | 0.571971 | 0.1 | 0.029443 | 0.249371 |
| 3 | DB | 2016 | 0.0058 | 0.117503 | 0.235174 | 0.097 | 0.2572 | 0.548308 | 0.07 | 0.025442 | 0.216525 |
| 4 | BOA | 2007 | 0.1054 | 0.11859 | 0.301952 | 0.158 | 0.2947 | 0.797285 | 0.12 | 0.019522 | 0.16462 |

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|---|-----|------|--------|----------|----------|-------|--------|----------|-------|----------|----------|
| 4 | BOA | 2008 | 0.1287 | 0.098381 | 0.239735 | 0.253 | 0.3347 | 0.722044 | 0.11 | 0.003901 | 0.039648 |
| 4 | BOA | 2009 | 0.1475 | 0.094808 | 0.30971 | 0.364 | 0.3095 | 0.532941 | 0.1 | 0.018327 | 0.193302 |
| 4 | BOA | 2010 | 0.0698 | 0.093238 | 0.283971 | 0.028 | 0.284 | 0.55 | 0.1 | 0.022387 | 0.240109 |
| 4 | BOA | 2011 | 0.0397 | 0.090794 | 0.3094 | 0.181 | 0.3208 | 0.518808 | 0.11 | 0.024519 | 0.270053 |
| 4 | BOA | 2012 | 0.026 | 0.11003 | 0.252309 | 0.341 | 0.2504 | 0.546977 | 0.087 | 0.026187 | 0.237999 |
| 4 | BOA | 2013 | 0.01 | 0.109018 | 0.246698 | 0.135 | 0.2467 | 0.532355 | 0.1 | 0.026059 | 0.239033 |
| 4 | BOA | 2014 | 0.0089 | 0.13559 | 0.229815 | 0.081 | 0.2647 | 0.54021 | 0.1 | 0.024007 | 0.177055 |
| 4 | BOA | 2015 | 0.0084 | 0.132471 | 0.219869 | 0.077 | 0.2576 | 0.531133 | 0.1 | 0.021346 | 0.161134 |
| 4 | BOA | 2016 | 0.01 | 0.126243 | 0.228814 | 0.097 | 0.2489 | 0.587578 | 0.07 | 0.021427 | 0.169726 |
| 5 | WB | 2007 | 0.0525 | 0.115854 | 0.271248 | 0.158 | 0.268 | 0.756567 | 0.12 | 0.031887 | 0.275232 |
| 5 | WB | 2008 | 0.0839 | 0.146779 | 0.269241 | 0.253 | 0.2692 | 0.74433 | 0.11 | 0.033658 | 0.229313 |
| 5 | WB | 2009 | 0.077 | 0.163416 | 0.296626 | 0.364 | 0.2948 | 0.532066 | 0.1 | 0.043636 | 0.267022 |
| 5 | WB | 2010 | 0.0347 | 0.183166 | 0.294802 | 0.028 | 0.2966 | 0.605595 | 0.1 | 0.031453 | 0.17172 |
| 5 | WB | 2011 | 0.0351 | 0.165903 | 0.294353 | 0.181 | 0.2944 | 0.466283 | 0.11 | 0.040104 | 0.241733 |
| 5 | WB | 2012 | 0.024 | 0.192177 | 0.267586 | 0.341 | 0.2662 | 0.604179 | 0.087 | 0.040209 | 0.20923 |
| 5 | WB | 2013 | 0.0041 | 0.176107 | 0.243757 | 0.135 | 0.2438 | 0.607231 | 0.1 | 0.032717 | 0.185781 |
| 5 | WB | 2014 | 0.0086 | 0.185988 | 0.230438 | 0.081 | 0.2626 | 0.539949 | 0.1 | 0.027621 | 0.148512 |
| 5 | WB | 2015 | 0.0078 | 0.176086 | 0.221238 | 0.077 | 0.3 | 0.61513 | 0.1 | 0.025705 | 0.145979 |
| 5 | WB | 2016 | 0.0021 | 0.173312 | 0.415005 | 0.097 | 0.2493 | 0.677545 | 0.07 | 0.023202 | 0.133873 |
| 6 | UB | 2007 | 0.0459 | 0.164808 | 0.538458 | 0.158 | 0.26 | 0.813843 | 0.12 | 0.029447 | 0.178672 |
| 6 | UB | 2008 | 0.0398 | 0.143948 | 0.552071 | 0.253 | 0.28 | 0.740746 | 0.11 | 0.028009 | 0.194575 |
| 6 | UB | 2009 | 0.0462 | 0.111764 | 0.611 | 0.364 | 0.3 | 0.577063 | 0.1 | 0.020115 | 0.17998 |
| 6 | UB | 2010 | 0.0376 | 0.108129 | 0.537568 | 0.028 | 0.3 | 0.532985 | 0.1 | 0.029606 | 0.2738 |
| 6 | UB | 2011 | 0.0335 | 0.116675 | 0.515997 | 0.181 | 0.28 | 0.52527 | 0.11 | 0.030009 | 0.257198 |
| 6 | UB | 2012 | 0.0233 | 0.125382 | 0.525141 | 0.341 | 0.27 | 0.590475 | 0.087 | 0.033898 | 0.270359 |
| 6 | UB | 2013 | 0.0033 | 0.120384 | 0.246426 | 0.135 | 0.2064 | 0.25335 | 0.1 | 0.028259 | 0.234741 |
| 6 | UB | 2014 | 0.01 | 0.132639 | 0.229494 | 0.081 | 0.2532 | 0.531411 | 0.1 | 0.023422 | 0.176585 |
| 6 | UB | 2015 | 0.009 | 0.117419 | 0.214715 | 0.077 | 0.275 | 0.574043 | 0.1 | 0.019589 | 0.166832 |
| 6 | UB | 2016 | 0.011 | 0.120001 | 0.208914 | 0.097 | 0.2732 | 0.646081 | 0.07 | 0.01963 | 0.163579 |
| 7 | NIB | 2007 | 0.0556 | 0.163104 | 0.282203 | 0.158 | 0.283 | 0.934482 | 0.12 | 0.029012 | 0.177877 |
| 7 | NIB | 2008 | 0.0673 | 0.163865 | 0.28804 | 0.253 | 0.288 | 0.823419 | 0.11 | 0.030969 | 0.188989 |
| 7 | NIB | 2009 | 0.1116 | 0.151633 | 0.298997 | 0.364 | 0.2995 | 0.642538 | 0.1 | 0.032052 | 0.21138 |
| 7 | NIB | 2010 | 0.0737 | 0.153506 | 0.295722 | 0.028 | 0.2957 | 0.592857 | 0.1 | 0.033646 | 0.219187 |
| 7 | NIB | 2011 | 0.0504 | 0.164622 | 0.283781 | 0.181 | 0.2838 | 0.514294 | 0.11 | 0.034651 | 0.21049 |
| 7 | NIB | 2012 | 0.03 | 0.184631 | 0.265086 | 0.341 | 0.2651 | 0.618063 | 0.087 | 0.034587 | 0.187333 |

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|---|-----|------|-------|----------|----------|-------|--------|----------|------|----------|----------|
| 7 | NIB | 2013 | 0.003 | 0.182177 | 0.243827 | 0.135 | 0.2438 | 0.665541 | 0.1 | 0.031305 | 0.171837 |
| 7 | NIB | 2014 | 0.028 | 0.182777 | 0.243232 | 0.081 | 0.2468 | 0.682512 | 0.1 | 0.029195 | 0.159731 |
| 7 | NIB | 2015 | 0.026 | 0.164249 | 0.023532 | 0.077 | 0.2598 | 0.705337 | 0.1 | 0.025428 | 0.154813 |
| 7 | NIB | 2016 | 0.021 | 0.159058 | 0.207527 | 0.097 | 0.2732 | 0.604683 | 0.07 | 0.024623 | 0.154802 |

Source: Financial statement of the banks, NBE and MoFED via simple excel