ST.MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DETERMINANTS OF NONPERFORMING LOANS

OF ETHIOPIAN COMMERCIAL

BANKS

.

BY: MESELE BEJU

JUNE, 2016

ADDIS ABABA, ETHIOPIA

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A THESIS SUBMITTED TO ST.MARY'S UNIVERSITY SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION (GENERAL MANAGEMENT)

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This is to certify that the thesis prepared by Mesele Beju, entitled: Determinants of Non-performing loans of Ethiopian commercial Banks and submitted in partial fulfillment of the requirements for the degree of MA in Business Administration (MBA) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Approved by

Advisor Name: - Dr Abebaw Kassie

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Date_____

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Acknowledgment

Abbreviation/Acronym

AIB: - Awash International Bank

ALR: Average lending rate

ARDL: - Autoregressive Distributed Lag

BLUE:- Best Linear Unbiased Estimators

BOA: - Bank of Abyssinia

CAR: - Capital Adequacy Ratio

CBB: - Construction and Business Bank

CBE: - Commercial Bank of Ethiopia

CBO: - Cooperative Bank of Oromia

CEMAC: - Central African Economic and Monetary Community

CEEC: - Central Eastern European Countries

CESEE: - Central, Eastern and south eastern European

CIT: - Corporate Income Tax

CPI: - Consumer Price Index

CSA: - Center of Statistical Agency

DB: - Dashen Bank

ECBs: - Ethiopian Commercial Banks

ETR: - Effective Tax Rate

GDP: - Gross Domestic Product

GMM: - Generalized Methods of Moments

IMF: - International Monetary Fund

INFR: - Inflation Rate

LIB: - Lion International Bank

LTD: Loan to deposit

MENA: - Middle East and North Africa

NBE: - National Bank of Ethiopia

NIB: - Nib International Bank

NPL: -Nonperforming Loan

OLS: - Ordinary Least square

ROA: -Returns on Asset

ROE: -Return on Equity

SPSS: -Statistical Package for Social Sciences

UB: - United Bank

US: - United States

VIF: - Variance Inflation Factors

WB: - Wegagen Bank

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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 quantitative method research approach. The study uses a secondary data collected from national bank of Ethiopia of ten commercial banks in Ethiopia and relevant data on macroeconomic factors considered for the period from the year 2007 to 2014. Besides, 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 findings of the study show that, return on equity, average lending rate and inflation rate have negative and statistically significant relationship with banks' NPLs. On the other hand, Loan to deposit ratio has a positive and statistically significant relationship with banks' NPLs. However, the relationship for gross domestic product and nonperforming loan found to be statistically insignificant. The study suggests that focusing the banks alongside the key drivers of NPLs could reduce the probability of loan default in Ethiopian commercial banks. Furthermore this study suggests commercial banks to have updated a detailed credit procedure which considers the current macroeconomic factors and the market situations as a whole.

Key words: nonperforming loan, bank specific determinant, Macroeconomic determinants

Chapter One

Introduction

1.1 . Background of the study

Banks role in the economy of any country is very significant. They play intermediation function in that they collect money from those who have excess and lend it to others who need it for their investment. Availing credit to borrowers is one means by which banks contribute to the growth of economies (Negera, 2012).

According to Felix A. *et.al*, (2008) Credit creation is the main income generating activity for the banks. However, this activity involves huge risks to both the lender and the borrower. The risk of a trading partner not fulfilling his or her obligation as per the contract on due date or anytime thereafter can greatly jeopardize the smooth functioning of a bank's business

International Monetary Fund (IMF, 2008)defined non-performing loan (NPL) as 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 Committee, 2011)puts non-performing loans as loans left unpaid for a period of 90 days. Non-performing loans are those loans that are ninety days or more past due or no longer accruing interest or non-performing loans are those loans, which are not generating income. This is also articulated by (Caprio and Klingebiel , 1996), as non-performing loans are those loans which are relatively long period of time do not generate income that is, the principal and or interest on these loans have been left unpaid for at least ninety days. In the other word, non-performing loans (NPL) exist when the borrower default in making their payment according to the schedule agreed upon the acceptance of the contract between lender and borrower.

In general, an asset/loan becomes non-performing when it ceases to generate income for the bank. The economic and financial costs of NPL's are significant. Graham and Humphrey (1978) suggested that, banks with larger amounts of NPL have greater tendency to incur large amount of future losses, and hence, NPL should be included as an indicator of the banking system stability.

(Fofack and Hippolyte, 2005)Pointed out that, these loans might negatively affect the level of private investment, increase deposit liabilities and constrain the scope of bank credit.

NPLs have an adverse effect on banking sectors survival. Thus, since nonperforming loans had an adverse effect on the banking sectors' survival, the cause for NPLs should be given due consideration. Its causes are different in different countries that might be due to situational factors such as the level of economic condition in which the banking sectors are operating and bank level factors. Consequently, this issue attracted different researcher's interest in different countries. Thus, many studies are performed on the determinants of NPLs of financial sectors worldwide. For instance:-

(Saba *et.al*, 2012) Made study on the determinants of NPLs on US Banking sector and found as lending rate had negative while inflation and Real GDP per capital had positive and significant effect on NPLs. Besides, (Loizis *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. The study of (Skarica, 2013)on the determinants of NPLs in Central and Eastern European countries through fixed effect model was also found as GDP growth rate, unemployment rate and inflation had negative and significant impact on NPLs. Similarly, (Carlos & Andres O.B., 2012)based on OLS model estimators found as NPLs have negative association with GDP growth rate whereas a positive association with unemployment rate.

Thus, the ever-increasing amounts of bank loan equivalent with the development of the country's economy, the inconsistency of results in different studies are among the motives, which trigger me to conduct the 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.

1.2 . Statement of the problem

Banks exist to provide financial intermediation service while at the same time attempt to maximize profit and shareholders' value. Lending is considered the most important function for fund utilization of Commercial Banks as major portion of their income is earned from loans and advance (Radha *et.al,* 1980).

Issues of Nonperforming Loans (NPLs) gained increasing attentions in the past few decades. Poor loan management will contribute to NPLs. 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 (Isac*et.al*, 2004).If the loan is well managed; it will increase the bank's profitability and sustainability in the future. 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. An increase in NPLs leads high level of provision expenses, which diminishes income. Again, mismatch of maturities between asset and liability creates 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.

Following the 2008 NBE declaration[1], NPLs of Ethiopian Commercial Banks have shown a significant improvement and lowered to an average of 5 % (NBE, 2011). However, there is a significant variation on the reduction of NPLs from banks to bank. In some bank the change is abrupt and surprise while in the others the change is steady and constant. For instance, in 2006 NPLs of CBE were about 22% of their total loan outstanding. Surprisingly however, in 2011 it lowered to an average of 0.86%. On the other hand, within the same time range NPLs of NIB lowered from 8.4% to 5.04 % (NBE 2012). This is not significant as compared to the performance of CBE.

Despite the above discussion, the recent work of Mehari (2012) cited on (Tsgie, 2013) argued that, the exciting reduction of NPLs in ECBs is not resulted from improved credit risk controlling, measuring and monitoring system. Rather, it is merely from writing off and restructuring of loans. As far as both writing off and restructuring of NPLs are a post active measurement (after the occurrence of NPLs), the issue of preventing NPLs in ECBs is still in question. Moreover, there are still banks that are not fulfilling the 5% maximum allowable limit of NPLs. For instance, in 2011 NPLs of CBB was 7%. In addition, NPLs of Cooperative Bank of Oromia (CBO) and Nib International Bank (NIB), in 2010 was about 14.58% and 7.37%, Bank of Abyssinia (BOA), in

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[1] The declaration that required all commercial banks not hold NPLs that exceed 5% of their total loan outstanding.

2009 was about 14.75% of their total loans respectively (NBE 2012). These are far from the 5% maximum acceptable limit.

The above discussed gaps in the ECBs in relation to credit risk management in general and NPLs in particular along with the above deviant observation of NPLs at CBB, NIB, BOA and CBO initiate the researcher to involve in this topic area.

To this end the researcher wants to examine the determinants of NPLs, by using two macroeconomic and three bank specific variables and adopt a quantitative type research and set feasible recommendations for the impact of identified variables on the levels of NPLs. Therefore, the researcher used panel data for the period from 2007 to 2014 that obtained from NBE and commercial banks.

1.3 Objective of the problem

1.3.1 General objective

In line with the problems highlighted above, the main objective of this paper was to examine the determinants of non-performing loan in commercial banks of Ethiopia.

1.3.2 Specific objective

In line with the main objective, this paper has the following specific objectives

- To examine bank specific determinants (ROE, LR, LTD) of non-performing loan in commercial banks of Ethiopia
- To examine macroeconomic determinants (Inflation rate and growth on GDP)of non-performing loan in commercial banks of Ethiopia
- Determining which determinant is most significant factor for NPL.

1.4 Research Hypothesis

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. The results from the literature review (to be established in the next chapter) were used to establish expectations for the relationship of the different determinants. Hence, In line with the broad objective of the study the following five hypotheses were formulated

H1: Return on equity (ROE) has negative and significant effect on Nonperforming loans of bank.

H2: Lending rate (LR) has negative/Positive significant effect on Nonperforming loans (NPLs) of banks.

H3: Loan to deposit ratio (LTD) has positive and significant effect on Nonperforming loans of banks.

H4: Inflation Rate (IR) has negative/positive significant effect on Nonperforming loans of banks.

H5: Gross domestic product (GDP) has negative significant effect on Nonperforming loans (NPLs) of banks'.

1.5 Scope and delimitation of the Study

This thesis was focus on its objectives of examining the determinants of NPLs of commercial Banks in Ethiopia within the limits of specified time and possibility. The researcher decided to limit this study to the commercial banks found in Ethiopia namely commercial bank of Ethiopia, Construction and business bank, Dashen bank, Awash international bank, bank of Abyssinia, Wegagen bank, United bank, Nib International bank, Cooperative Bank of Oromia and Lion International Bank which were registered by NBE before the year 2007/2008. Those banks were selected since they were senior banks and are expected to have more experience on the lending activities. Besides, this study is limited to both bank specific and macroeconomic determinants like bank profitability (ROE), loan to deposit ratio, average lending rate, growth on Gross domestic product, and inflation rate as explanatory variables of nonperforming loan. To this end, this study covers a panel data of these banks over the period 2007 to 2014.

1.6 Limitation of the study

In conducting this study, the researcher encounter various problems, from these problems the first was there was lack of financial data for recent year, 2015 for the sampled banks. Therefore, the study is limited to take data up to the year 2014. Second, resource and time constraints were also some of the factors that hindered the outcome of the research. In addition to this, there were difficulties to get all data from NBE. Thus, the researcher gathers relevant data from financial

statements of the sampled banks. However, the above resistant factors make this study difficult; and hope that readers will get some valuable ideas from the outcome of this study.

1.7 Significance of the study

This investigation would help Ethiopian Commercial Banks to get insight on what it takes to improve their loan qualities. In addition, this study also will have important practical implications for commercial banks mangers and bank regulators authorities in dealing with NPLs management. In addition, this study will initiate the commercial banks management to give due emphasis on the management of these identified variables and provides them with understanding of activities that will enhance their loan performance.

For National bank of Ethiopia, the finding of this study might be used as a directive input in developing regulatory standards regarding the lending policies of commercial banks of Ethiopia and to examine its policy in banking supervision pertaining to insure asset quality of banks to be maintained.

Besides, it may also help other researchers as a source of reference and as a stepping stone for those who want to make further study on the issue of NPLs in the Ethiopian banking context afterwards. Finally, it may provide a possible opportunity to all stake holders to gain deep knowledge about the leading cause of NPLs in Ethiopian commercial banking sector.

1.8 Organization of the study

The main objective of this study was to identify the internal and external factors that influence nonperforming loan of Commercial Banks in Ethiopia. The rest of this study is organized as follows. Chapter One: Provide some background about the study, problem statement, specifies the objectives and purpose of the study, as well as the significance and benefits gained from this research. Chapter two: review of related literatures will includes conceptual frame work of nonperforming loan, determinants of nonperforming loan, prior cross country and single country studies of the area and knowledge gap. Chapter three: This chapter describes the data, identifies the sources of data, variable specification, and model specification and explains the methodology which is employed in the study. The results of the different methods used are presented in chapter four. This is followed by an analysis of the results of the different methods. Finally, chapter five presents the conclusions and recommendations.

Chapter Two

Literature Review

This chapter discusses about the theoretical literatures and previous studies that have been conducted by various researchers from the perspective of non-performing loans of banking institutions. This literature reviews focus on both the bank specific and macroeconomic factors that affect non-performing loans of the commercial banks.

2.1. Theoretical Literature

2.1.1.Operational Definitions

National Bank of Ethiopia (NBE)- it is the resource or central bank of Ethiopia besides licensing and supervising banks, insurers and other financial institutions, NBE fosters a healthy financial system and undertakes other related activities that are conductive to rapid economic development of Ethiopia (Proclamation No 529/2008, FDRE. 2008)

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(NBE, 2002)

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, 2002)

Credit risk – the risk arise as result when the borrower fail to conclude its financial contract according to the agreement with lender. It is an asset default by counter party.

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

Lender: - the one who lends money for the borrower.

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

Loan provisioning:-the determination or estimation of the amount of non-performing loans which are likely to be uncollectible and providing for those on the basis of aging and risk class category of the loans concerned.

Bank specific factors: - are variables that are under the control of bank management. They can be directly or indirectly stated in the bank's financial statements.

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.

2.1.2. 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 (David*et.al,*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 (Seyoum, 2010). Which 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(Gezu, 2014).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 pays back, but sometimes not always in regular installments, to the lender. This service is provided by 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 A.et.al, 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 (Lloyd B and Thomas, 2006). A loan composition greatly varies among banks based on their size, location, trade area and lending experts. Macdonald *et.al,*(2006).

According to (Seyoum, 2010), lending is the provision of resources (granting loan) by one party to another. The second party does not reimburse the first party immediately there by generating a debt, and instead arranges either to repay or return those resources later. 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 *et.al,*(2006).

2.1.3 .Factors Affecting Bank Loan

According to (Seyoum, 2010), the sources of fund for lending are reserve, deposits and capital. All these sources may be affected by different factors and would have a direct influence on lending. 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.

According to Reed and Gill (1989) cited in (Gezu, 2014)therefore, the factors that influence bank loans, that might have their own impact on NPLs are.

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.

Profitability: Some banks may emphasize earning more than others may. 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.

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.

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.

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 (Seyoum, 2010) there are also other factors that affect bank lending and investing activities. These factors include:

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

2.1.4. Nonperforming Loans (NPLs)

There is no global standard to define non-performing loans at the practical level. However there are some common opinions on this issue.

Accordingly, the IMF's Compilation Guide on Financial Soundness Indicators, NPLs is defined as: "A loan is nonperforming when payments of interest and/or principal are past due by 90days or more, or interest payments equal to 90 days or more have been capitalized, refinanced, or delayed by agreement, or payments are less than 90 days overdue, but there are other good reasons such as a debtor filing for bankruptcy to doubt that Payments will be made in full"(IMF, 2008).

A non-performing loan (NPL) is defined as a sum of borrowed money upon which the debtor has not made his or her scheduled payments for at least 90 days. A nonperforming loan is either in default or close to being in default. Once a loan is Nonperforming, the odds that it will be repaid in full are considered substantially lower. If the debtor starts making payments again on a nonperforming loan, it becomes a re-performing loan, even if the debtor has not caught up on all the missed payments. Saba et.al, (2012)

Furthermore, the Ethiopian banking regulation also defines NPL as follows:

"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, 2002)

As per the (NBE, 2002) directive No SBB/32/2002, loans and advances classified as explained below:

i.   **Pass Loans: -** Loans and advances in this category are fully protected by the current financial and paying capacity of the borrower and are not subject to criticism.

ii. **Special Mention:-**Any loan or advance past due 30 (thirty) days or more, but less than 90 (ninety) days shall be classified as special mention.

iii. **Sub-standard:-** Non-performing loans and advances past due 90 (ninety) days or more but less than 180 (one hundred eighty) days shall at a minimum be classified as substandard.

iv. **Doubtful Loans: -**Non-performing loans or advances past due 180 (one hundred eighty) days or more but less than 360 (three hundred sixty) days shall be classified at a minimum as doubtful.

v.   **Loss Loans: -**Non-performing loans or advances past due 360 (three hundred sixty) days or above shall be classified as loss loans.

According to directive No SBB/43/2008all Ethiopian commercial banks required holding provision percentages against the outstanding principal amount for each loan or advance classified on the above criteria's to absorb the potential losses in their loans portfolio. The minimum provision requirements are mentioned below:

Table2.1 Minimum provision requirement

Classification of loans	Minimum percentage
pass	1%
Special mention	3%
Substandard	20%
Doubtful	50%
loss	100%

Source: NBE directive No. SBB/43/2008

Generally, NPLs are loans that are outstanding in its both principal and interest for a long period contrary to the terms and conditions under the loan contract. Any loan facility that is not up to date in terms of payment of principal and interest contrary to the terms of the loan agreement is NPLs. Thus, the amount of nonperforming loan measures the quality of bank assets (Tesfaye, 2012)

2.2. Empirical Literature

On This chapter many evidences, which identify the major determinants of bank loans, particularly, nonperforming loans will be discussed. 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 will focus 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 government policies. For instance; unexpected events, changing in rules and obligations, political and economic changes (inflation and slump) are external factors Biabani S. *et.al*, (2012). However, a variety of variables that got more attention and included in this thesis are loan to deposit ratio, profitability (ROE), lending rate, Inflation rate and Growth on Gross domestic product.

2.2.1. Single Country Studies

One of the earliest studies on the determinants of NPLs is the work of (Keeton & Morris, 1987), who investigated the fundamental drivers of loan losses for a sample of nearly 2,500 US commercial banks for the period 1979–1985. Using simple linear regressions, they found 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 reported 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 *et.al*, (1991), investigated the loan loss experience of large commercial banks in the US from 1984 to 1987 by using a simple log linear regression model. They found that both internal and external factors explain the loan loss rate of US banks. These authors found a significant

positive relationship between the loan loss rate and internal factors such as high interest rates, excessive lending, and volatile funds. In addition, they reported that depressed regional economic conditions also explain the loss rate of the commercial banks. In addition, (Keeton, 1999)analyzed the impact of credit growth and loan delinquencies in the US banks from 1982 to 1996 with a vector auto regression model. The result has shown that, there is a strong relationship between credit growth and impaired assets. Specifically, rapid credit growth was associated with lower credit standards and contributed to higher loan losses in US banks.

As Sakiru A. *et.al*, (2011) studied on macroeconomic determinants of nonperforming loan on banking system in Malaysia. Their study was covered bank`s data for monthly time series of 2007 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.

Lei, *et.al*(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, the 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.

(Serpil & 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.

According to, (Bashir and Ahmed , 2013) conducted a study on the "Macroeconomic Determinants of Nonperforming Loan of Banking Sectors in Pakistan": The study was conducted on 30commercial banks from 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 2006-2011in 2013, they found positive significant effect of ROA but insignificant effect of ROE on 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.

Loizis *et al*., (2010) conducted study to examine the determinants of NPLs in the Greek financial sector using fixed effect model from 2003-2009 periods. The variables included were ROA, ROE, solvency ratio, loan to deposit ratio, inefficiency, credit growth, lending rate and size, GDP growth

rate, unemployment rate and lending rates. The finding reveals that loan to deposit ratio, solvency ratio and credit growth has no significant effect on NPLs. However, ROA and ROE has negative significant effect whereas inflation and lending rate has positive significant effect on NPLs. It justifies that performance and inefficiency measures may serve as proxies of management quality. (Shingjerji, 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, and 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, (Vighneswara and Swamy, 2012) conducts 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 Muhammad, 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 and 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.

Sarat*et.al*, (2003) Analyze the determinants of NPLs of commercial banks' in Indian in2002. The objective of the study was to evaluate how NPLs influenced by financial and economic factors and macroeconomic shocks. In the study, they utilized panel regression model and found that lending rate also have positive impact on the NPLs justifying that the expectation of higher interest rate induced the changes in cost conditions to fuel and further increase in NPLs. Besides, loan to deposit ratio had negative significant effect on NPls justifying 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.

Very recently, Azeem et al. (2012) also investigated the determinants of NPLs of US commercial banks from 1985-2010 by using correlation and regression tests. Their result have shown that a significant association between NPLs and real interest rate and GDP. Particularly, real interest rate has a significant positive relationship with NPLs of US commercial banking sector while GDP growth has significant negative relationship.

2.2.2. Cross Countries Studies
(Skarica, 2013), Conducted 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 from 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 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.

Boudriga *et.al*, (2009) also conducted a study on the title "bank specific determinants and the role of the business and the institutional environment on Problem loans in the MENA countries" for2002-2006 periods. They employed random-effects panel regression model for 46 countries. The variables included were credit growth rate, Capital adequacy ratio, real GDP growth rate, ROA, the loan loss reserve to total loan ratio, diversification, private monitoring and independence of supervision authority on nonperforming loans. The finding revealed that credit growth rate is negatively related to problem loans. Capital adequacy ratio is positively significant justifying that highly capitalized banks are not under regulatory pressures to reduce their credit risk and take more risks. In addition, ROA has negative and statistically significant effect on NPLs. This result supports as greater performance measured in terms of ROA reduces nonperforming loans since reduced risk taking in banks exhibiting high levels of performance.

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. Similarly, Carlos*et.al* (2012) on macroeconomic determinants of the Non-Performing Loans in Spain and Italy found as inflation rate has insignificant effect on NPLs.

As (Nir & Klein, 2013) Investigated 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 each16 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.

2.3. Conceptual Frame Work

The main objective of this study is to examine the determinants of NPLs of commercial banks in Ethiopia. Based on the objective of the study, the following conceptual model is framed. However, there are different factors affects nonperforming loans as previously discussed in the related literature review parts, this study will use the following determinants based on the time and cost given to the study.

Therefore, the following conceptual model is framed to summarize the focus and scope of this study in terms of variables included.

Figure 2.1 *Conceptual framework*
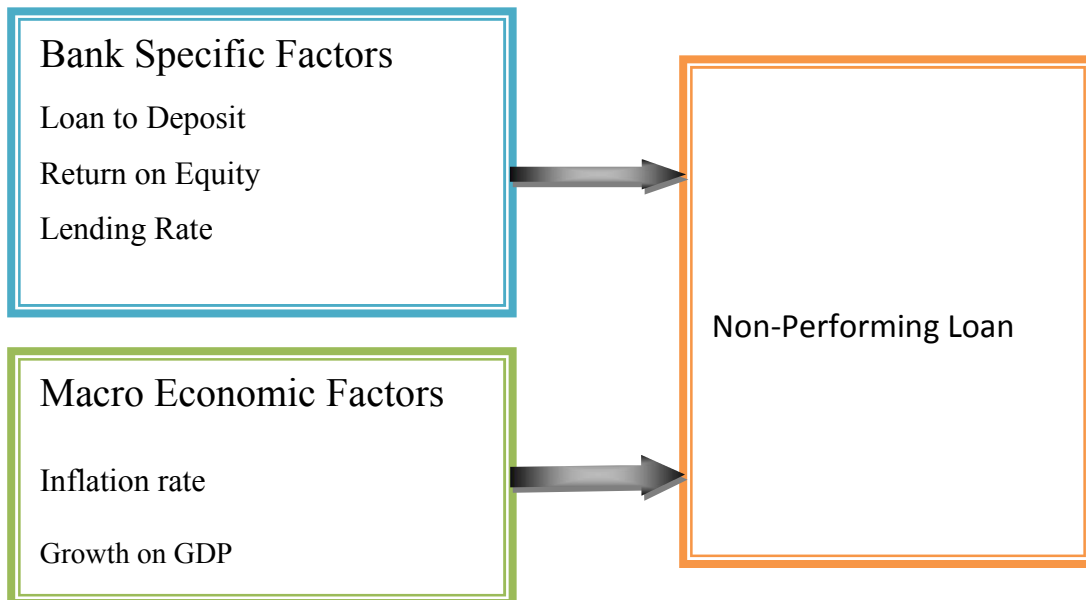
Chapter Three

Research Methodology

The preceding chapter presented the review of the existing evidence on factors affecting nonperforming loan and identified the knowledge gap. The results from a review of the literature are used to establish expectations for the relationship of the different determinants. Therefore, the purpose of this chapter is to present the research methodology, the underlying principles of research methodology and the choice of the appropriate research method for the thesis. The chapter is organized as follow the first section 3.1 presents the research design. Section 3.2 discusses the sample design while section 3.3 presents the data type and source, 3.4 present the data analysis and presentation; section 3.5 presents the study variable, and finally section 3.6 presents model specification.

3.1. Research Design

The choice of research design depends on objectives that the researchers want to achieve (John, 2007). Since this study is designed to examine the relationships between NPLs and its determinants, a logical reasoning either deductive or inductive is required. Deductive reasoning starts from laws or principles and generalizes to particular instance whereas inductive reasoning starts from observed data and develops a generalization from facts to theory. Besides, deductive reasoning is applicable for quantitative research whereas inductive reasoning is for qualitative research. Thus, due to quantitative nature of data, the researcher used deductive reasoning to examine the cause and effect relationships between NPLs and its determinants in this study.

As noted by (Kothari, C.R., 2004), explanatory research design examines the cause and effect relationships between dependent and independent variables therefore, since this study will examine the cause and effect relationships between nonperforming loans and its determinant, it is an explanatory research. The objective to be achieved in the study is a base for determining the research approach for the study. In case, if the problem identified is factors affecting the outcome having numeric value, it is quantitative approach (Creswell, 2003). Therefore, the researcher will employ quantitative research approach to see the regression result analysis with respective empirical literatures on the determinants of Nonperforming loans. Thus, in this study, a panel data from 2007 to 2014 period is employed.

3.2. Sample Design

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). The target population for this study was all commercial banks that were registered by NBE and operational in the country. Sample design deals with sample frame, sample size and sampling technique.

As of June 2015, there are nineteen registered banks in Ethiopia. However, one of the nineteen banks, Development bank of Ethiopia is not Commercial bank and excluded in this study population.

As noted by (Kothari, C.R., 2004), good sample design must be viable in the context of time and funds available for the research study. Accordingly, this study employed purposive sampling technique to select the required sample of banks from the registered commercial banks since it is viable in line with time and funds available for this study. The selection criteria set by the researcher is first, the required banks are only Commercial banks in Ethiopia. Second, those commercial banks should operate before 2007/2008 having financial statements for Eight years consecutive data of selected commercial banks that provide financial statements consecutively from 2007-2014 periods. Therefore, the data of this study was collected from ten commercial banks in the country.

The researcher believes that the sample size is sufficient to make sound conclusion about the population as far as it covers around 40% of the total population. Moreover, the inclusion of CBE in the sample which has long year experience and takes lion share in the country's banking industry make the sample more representative and reasonable. Thus, this study will have 80 observations.

3.3. Data Type and Source

This study was used panel data to conduct this research. In order to achieve the stated objective, a panel data were collected through structured document review. As noted in (Brooks, 2008) using a panel data has the following advantages: First, and perhaps most importantly, researchers can address a broader range of issues and tackle more complex problems with panel data than would be possible with pure time-series or pure cross-sectional data alone. Second, by combining cross-

sectional and time series data, researchers can increase the number of degrees of freedom and the power of the test by employing information on the dynamic behavior of a large number of entities at the same time. Finally, the additional variation introduced by combining the data in this way can also help to mitigate problems of multicollinearity that may arise if time series and cross sectional are modeled individually

Accordingly, the researcher was used secondary sources of data that is panel in nature. The researcher preferred a secondary source of data since it is less expensive in terms of time and money while collecting. Moreover, it affords an opportunity to collect high quality data (Saunders et al (2007) cited in (Gezu, 2014). The data were obtained from the National Bank of Ethiopia and the head office of each sample commercial banks. Besides, related books, journals articles and various manuals also used as sources of Secondary data this data will contain both Bank specific and macroeconomic factors.

3.4. Data Analysis and Presentation

The Secondary data was collected from NBE, and head office of each respective bank and was analyzed to determine its suitability, reliability, adequacy and accuracy. Thus, this study utilized both descriptive and econometric analysis based on a panel data from 2007-2014 to examine the relationship between the NPLs and its determinant factors in commercial banks found in Ethiopia. The collected data was processed and analyzed through STATA version 11 software packages. For descriptive analysis, table and percentage was 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 multicolinearity test was 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 Multicolinearity among variables, correlation matrixes and variance inflation factor was used. To this end, the researcher has used fixed effect model to analyze the panel data obtained from NBE and head office of each commercial bank. Thus, regression results were presented in a tabular form with the appropriate test statistics and then an explanation of each parameter will give in line with the evidence in the literature.

3.5. Study Variables

The dependent variable used in this study was Nonperforming loan ratio. It is measured in terms of Nonperforming loans to gross loan. Besides, explanatory variables which included in this study were loan to deposit ratio, profitability, lending rate, growth in Gross Domestic Product and inflation 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.

3.5.1. Dependent variable

Nonperforming Loan

Nonperforming loans (NPLs) are loans that are outstanding both in its principal and in interest for a long period contrary to the terms and conditions under the loan contract. Any loan facility that is not up to date in terms of payment of principal and interest contrary to the terms of the loan agreement is NPLs. Thus, the amount of nonperforming loan represents the quality of bank assets (Tesfaye, 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, 2002). 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. Nonperforming loan is measured by dividing the amount of NPLs to gross loans.

$$\text{NPL ratio} = \frac{NPL}{Total\ loan}$$

3.5.2. Independent Variables

Independent variables are explanatory variables that explain the dependent variables. The independent variables included on this study include both bank specific and macroeconomic

determinants. The bank-specific variables are internal factors and controllable for banks" managers while the macroeconomic variables are uncontrollable and hence external. Therefore, independent variable included in this study are indictors of bank profitability (ROE),loan to deposit ratio (LTD), lending rate (LR), Gross Domestic Product (GDP), and Inflation rate(IR)..

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 week monitoring for both operating cost and credit quality of customers, which will include high levels of capital losses (Haneef *et.al*, 2012). Thus, ROE is considered as profitability indicators of banks in this study.

Return on Equity (ROE): 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 generates with the money shareholders have invested. Thus, ROE measures how much the bank is earning on their equity investment. Therefore, this ratio is expected to have negative relationships with NPLs. It is measured by the ratio of net profit to total equity.

$$\mathrm{ROA} = \frac{\mathrm{Net\ profit}}{Total\ Equity}$$

H1: Return on equity (ROE) has negative significant relationship with Nonperforming loans of commercial Banks in Ethiopia.

Loan to deposit (LTD) Ratio

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 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 (Sarat*et.al*, 2003). Thus, it represents a bank's preference for credit. Credit culture 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.

$$LTD = \frac{\text{Total Outstanding Loan}}{TotalDeposit}$$

H2: Loan to deposit ratio (LTD) has positive significant relationship with Nonperforming loans of banks.

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 costs 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 *et.al*, 2011). Interest rate is the price a borrower pays for the use of money they borrowed from the lenders.

Thus, lending rate is a rate of return usually remains in admittance of monetary regulators (NBE) to manipulate the pursuance of monetary objectives.

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 Muhammad, 2012)and Sarat*et.al*, (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.

H3: Lending rate (ALR) has negative/Positive significant relationship with Nonperforming loans (NPLs) of banks.

Inflation Rate

As mentioned in the literature, inflation affects borrowers' "debt servicing capacity through different channels and its impact on NPL can be positive or negative. According to (Farhan Muhammad, 2012), (Bruna & Skarica, 2013), (Nir & Klein, 2013)) and (Serpil*et.al*, 2013) found as there is a positive relationship between NPLs and Inflation rate. On the other hand, (Badar and Yasmin , 2013)found a strong negative association between inflation and NPLs. 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.

Hence, the relationship is indifferent in this study. In this study, annual inflation rate was used as a proxy measurement.

H4: Inflation Rate (IR) has negative/positive significant relationship with Nonperforming loans of Banks.

Growth in Gross Domestic Product (GDP)

GDP is the market value of all final goods and Services produced in a country during a specified time usually one year.

The empirical evidence suggested a negative relationship between the growth in real GDP and NPLs (Salas V and Saurina, 2002); (Sarat *et.al*, 2003); (Fofack and Hippolyte, 2005); and (Jiminez, G & Saurina, 2006). On the other hand, (Farhan Muhammad, 2012) found that, there is insignificant relationship between real GDP growth and NPLs. The explanation provided by the literature for this relationship is that 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. Hence, a negative relationship between GDP and NPLs is expected in this study. The variable used to capture real GDP growth was constructed by finding the annual percentage change

in the real GDP. Existing literature has suggested the significant negative association between growth in GDP and NPLs. The explanation for negative relation is that increase in growth of GDP leads to the increase in income of the individuals and firms hence their ability to repay the loans increases, as a result, NPLs decrease. Conversely, with the decrease in GDP, the individuals and firms income declines, hence their ability to repay loan decreases resulting in the growth of NPLs. Based on the captioned literatures the relationship between NPLs and Growth on GDP is expected to be negative for this study.

H5: Gross domestic product (GDP) has negative significant relationship with Nonperforming loans (NPLs) of banks'.

3.6. Model Specification

The nature of data that was used in this study enable the researcher to use panel/longitudinal data model which is deemed to have advantages over cross sectional and time series data methodology. Panel data involves the pooling of observations on the cross-sectional over several time periods. As (Brooks, 2008) stated the advantages of using panel data set; first and perhaps most importantly, it can address a broader range of issues and tackle more complex problems with panel data than would be possible with pure time-series or pure cross-sectional data alone.. The regression model that is existed in most literature has the following general form;

$$Y_{it} = \beta_0 + \beta X_{it} + \varepsilon_{it}$$

Where: - Y_{it} is the dependent variable for firm 'i' in year 't', β_0 is the constant term, β is the coefficient of the independent variables of the study, X_{it} is the independent variable for firm 'i' in year 't' and ε_{it} the normal error term.

Thus, this study is based on the conceptual model adopted from Fawad and Taqadus (2013) cited on (Gezu, 2014).

Accordingly, the estimated models used in this study are modified and presented as follow;

$$NPL_{it} = \beta_0 + \beta_1(LTD)_{it} + \beta_2(ROE)_{it} + \beta_3(LR)_{it} + \beta_4(INFR)_{it} + \beta_5(GDP)_{it} + \varepsilon_{it}$$

Where;

- ➢ β_0 is an intercept
- ➢ $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$, and β_6 represent estimated coefficient for specific bank i at time t,
- ➢ LTD, ROE, LR, INF and GDP represent Loan to deposit ratio, return on equity, Average lending rate, inflation rate and growth on gross domestic product respectively

➤ εit represents error terms for intentionally/unintentionally omitted or added variables. It has zero mean, constant variance and non- auto correlated.

The coefficients of explanatory variable were estimated by the use of ordinary least square (OLS) technique.

Chapter 4

Data Presentation, Analysis and Interpretation

The previous chapters presented orientation of the study, theoretical foundations, literature review and the research methods adopted in the study. This chapter presents the results in order to achieve research objectives and set a base for conclusion. As discussed in the preceding chapter this study is aimed at exploring bank specific determinants of nonperforming loans. This chapter tries to present the results of different sources of data. The chapter is organized into five sections. The first section presents descriptive statics' and discussion, the second section presents diagnostic tests for CLRM assumptions; the third section describes model specification, the fourth section describes result of the regression analysis and lastly the results will be discussed in accordance with supportive literatures.

4.1. Descriptive Statistics of the Data

The descriptive statistics for dependent and independent variables are presented below. For both dependent and independent variables value of minimum, maximum, mean and standard deviation are presented. The dependent variable is non-performing loan and measured by impaired loan (bad loan) to total loan. The remaining are independent variables such as: Return on Equity, Loan to deposit ratio, real Interest rate, gross domestic product and inflation rate. Table 4.1 bellow Present the descriptive statistics of dependent and independent variables.

Table 4.1: **Descriptive Statistics**

VARIABLE	OBS	MEAN	STD. DEV	MIN	MAX
NPL	80	5.67175	3.765296	.11	17.06
ROE	80	26.188	13.91128	-7.41	77.71
LDR	80	61.35775	13.4774	30	100.53
ALR	80	11.72125	0.5481254	10.5	12.25
INF	80	19.7	10.63	6.3	36.4
GDP	80	10.51	0.9580175	8.7	11.8

Source: own computations from NBE

The mean value for NPL (impaired loan to total loan) of banks was 5.67 percent with a standard deviation of 3.76 percent. The average value of nonperforming loan for eight consecutive years was above the average requirement of national bank of Ethiopia (5%) and there were a big variation across the sample banks NPL ratio. NPL for the sample period was ranged from 0.11 percent to 17.06 percent, the minimum and maximum value respectively. The minimum value (0.11%) also registered from the newly opened bank at a time and the ratio increased gradually which shows that nonperforming loan is still a big problem for Ethiopian commercial banks as a whole.

As far as profitability ratios concerned, 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 4.1, ROE records a minimum of -7.41% and maximum of 77.71% with a mean of value of 26.18%.This implies that commercial banks in Ethiopia have relatively a good performance in terms of ROE during the study period. Thus, commercial banks in Ethiopia earned high return from its own equity than assets.

The mean value of loan to deposit ratio was 61.36 percent which shows that the average value of banks loan to deposit ratio was very high, again it tells us on average loans are the most important asset for commercial banks in Ethiopia. The standard deviation 13.48 percent reveals that there was high variation towards the mean and lending power among banks in Ethiopia. The maximum and minimum values were 100.53 percent and 30 percent respectively.

Finally, the mean value of lending interest rate over the period under study was 11.72 %, on average commercial banks' lending interest rate in Ethiopia is 10.55% and there is a modest variation on interest rate margin toward its mean value over eight consecutive years because the value of standard deviation is below one percent (0.5%). with the maximum and minimum values of 12.25 % (in the years 2009 and 2010) and 10.5 % (in the year 2007 respectively.

Regarding the macroeconomic variables that can affect banks nonperforming loan over time, The mean value of real GDP growth rate is 10.51 % indicating the average real growth rate of the country's economy over the past eight years was a good one with averagely on two digit growth, there was a stable economic growth because the standard deviation is 0.96 percent. The maximum

growth of the economy was recorded in the year 2007 (i.e. 11.8%) and the minimum was in the year 2012 (i.e. 8.7%).

The rate of inflation was highly dispersed over the periods under study towards its mean 19.24 with standard deviation of 10.63%. The maximum inflation rate was recorded in the year 2009 (i.e. 36.4%) and the minimum was in the year 2011 (i.e. 2.8%).

4.2. Test Results for CLRM Assumption

Before going further in to panel data econometric procedures, the first issue is test the assumption of classical linear regression model (CLRM). This section provide test for the classical linear regression model (CLRM) assumptions such as normality, heteroscedasticity, autocorrelation and multicolinearity tests. The linearity of the parameter is assumed since the model applies linear ordinary least square(OLS). The objective of the model is to predict the strength and direction of association among the dependent and independent variables. Thus, in order to maintain the validity and robustness of the regression result of the research in CLRM, it is better to satisfy basic assumption CLRM assumptions. As noted by (Brooks, 2008), when these assumptions are satisfied, it is considered as all available information is used in the model. However, if these assumptions are violated, there will be data that left out of the model. Accordingly, before applying the model for testing the significance of the slopes and analyzing the regressed result, normality, multicolinearity, autocorrelation and heteroscedasticity tests are made for identifying misspecification of data if any so as to fulfill research quality.

4.2.1 Normality Test

One assumption of classical linear regression model (CLRM) is the normal distribution of the residual part of the model. As noted by Gujarati (2004), OLS estimators are BLUE regardless of whether the ui are normally distributed or not. If the disturbances (ui) are independently and identically distributed with zero mean and constant variance and if the explanatory variables are constant in repeated samples, the OLS coefficient estimators are asymptotically normally distributed with means equal to the corresponding β's.

However, as per the central limit theorem, if the disturbances are not normally distributed, the OLS estimators are still normally distributed approximately if there are large-sample data. Thus, since

the sample size for this study is large enough, it is approximately considered as normally distributed. This implies that residuals are asymptotically normal in this study.

In addition to the higher sample size this study was used Shapiro wilk normality test for this assumption.

4.2.2. Test for Multicollinearity Assumption

This assumption is concerned with the relationship exist between explanatory variables. If an independent variable is an exact linear combination of the other independent variables, then we say the model suffers from perfect colinearity, and it cannot be estimated by OLS Brooks (2008). Multicollinearity condition exists where there is high, but not perfect, correlation between two or more explanatory variables (Cameron and Trivedi , 2009), (Wooldridge, 2006). According to (Churchill*et.al*, 2005), when there is multicollinearity, the amount of information about the effect of explanatory variables on dependent variables decreases. As a result, many of the explanatory variables could be judged as not related to the dependent variables when in fact they are. This assumption does allow the independent variables to be correlated; they just cannot be perfectly correlated. If we did not allow for any correlation among the independent variables, then multiple regressions would not be very useful for econometric analysis.

To this end, Pearson correlation matrix and Variance inflation factor (VIF) were used for testing Multicolinearity in this study. Pearson correlation matrix is a technique used for testing Multicolinearity of explanatory variables by investigating their relationship and also useful to measure the propensity of how much the independent variables influence the dependent variable (Wooldridge, 2006).

As noted by (Gujarat, 2004), the correlation analysis is made to describe the strength of relationship or degree of linear association between two or more variables. In Pearson correlation matrix, the values of the correlation coefficient range between -1 and +1. A correlation coefficient of +1 indicates that the two variables have perfect positive relation; while a correlation coefficient of -1 indicates as two or more variables have perfect negative relation. A correlation coefficient of 0, on the other hand indicates that there is no linear relationship between two variables (Bedru and Seid, 2005) besides, as noted by (Brooks, 2008), zero correlation among explanatory variables is

not occurring in any practical work. Thus, even if there is some indication for the existence of zero correlation among the explanatory variables, it does not have a great effect on the accuracy.

Thus, as it can be seen from appendix1, I, the result of Pearson correlation matrix indicate that the highest correlation is between real ALR and LDR, which have positive 57.51% correlation. To this end there is no significant multicolinearity problems among explanatory variables since each of them are not above 0.8 thresholds. As noted by in (Gujarat, 2004)), a serious problem for Multicolinearity is occurred if the correlation is about 0.8 or larger. However, multicolinearity between explanatory variables may result wrong sign in the estimated coefficients and bias the standard errors of coefficients (Theodros, 2011). To overcome this problem, VIF test was conducted. That means, the larger the value of VIF indicates the more collinearity of the variables with each other. According to the rule of thumb, if VIF of a variable exceeds 10, the variable is said to be highly collinear (Bedru and Seid, 2005). Accordingly, the variance inflation factor test as indicated in appendix1, II. Based on the result indicated in appendix1, II, there is no Multicolinearity problem in this study. This is due to the fact that the mean of VIF of variables is 1.79 which is much lower than the threshold of 10.The VIF for each variable also very low. This indicates that the explanatory variables included in the model were not correlated with each other. To sum up, beside the descriptive statistics, correlation analysis is made for explanatory variable to detect the multicolinearity problem in the regression model. In case, there is no Multicolinearity problem between variables. Thus, the explanatory variables are the basic determinants of NPLs of commercial banks in Ethiopia. This of course enhanced the reliability of regression analysis.

4.2.3. Test for Autocorrelation

Furthermore, 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. The best renowned test for detecting serial correlation for panal data is Wooldridge test.

Accordingly, if the P computed is greater than 0.01 it is assumed that there is no autocorrelation problem, thus, as shown in appendix 1,V, the 'P' Value in this study was 0.0103 which is greater than 0.01 implying the absence of autocorrelation problem. Thus, this implies that error terms are not correlated with one another for different observation in this study.

4.2.4. Test for Heteroscedasticity

In the classical linear regression model, one of the basic assumptions is Homoskedasticity assumption that states as the probability distribution of the disturbance term remains same for all observations.. If the errors do not have a constant variance, they are said to be heteroskedastic. To test this assumption the Breusch-Pagan/Cook-Weisberg test, was used having the null hypothesis of Heteroskedasticity. This test states that if the p-value is significant at 95% confidence interval, the data has heteroscedasticity problem, whereas if the value is insignificant (greater than 0.05), the data has no heteroscedasticity problem. Thus, as shown in appendix1, IV, there is no heteroscedasticity problem for this study hence the p value is 0.6393.

4.3. Model Selection

Econometrics model used to examine the impact of loan to deposit ratio, return on equity, return on asset, lending rate, inflation and growth in real GDP on nonperforming loans of commercial banks in Ethiopia was panel data regression model which is either fixed-effects or random-effect model. The appropriate test used to decide whether fixed effect or random effect model is appropriate was Hausman Specification Test. Thus, Hausman Specification Test identifies whether fixed-effects or random-effect model is most appropriate under the null hypothesis that unobservable individual effects (ui) are uncorrelated with one or more of explanatory variables (Xi).As noted by (Gujarat, 2004), fixed effect model is most appropriate when null hypothesis is rejected whereas random effect is appropriate when null hypothesis is not rejected. For Hausman test, the null and alternative hypotheses are as follows:

Ho: $ui$is not correlated with Xi (random- effects model appropriate)
H1: $ui$is correlated with Xi (fixed-effects model appropriate)

Thus, to test the null hypothesis, it requires comparing the estimates from the random-effects and the fixed-effects estimator. Random-effect estimator is consistent under the null hypothesis, but in consistent under the alternative hypothesis whereas fixed-effect estimator is consistent under both the null and alternative hypothesis. If the estimates for the random-effects estimators are not significantly different from the estimates for the fixed-effects estimator, then the null hypothesis is accepted and concludes that $ui$is not correlated with Xi, and therefore the random-effect model is

the appropriate model. If the estimates for the random effect estimator are significantly differ from the estimates for the fixed-effect estimator, the null is rejected and conclude that *ui* is correlated with Xi, and therefore the fixed-effect model is the appropriate model for the study. Accordingly, appendix 1 VI, demonstrates the Hausman Specification Test that used to decide the best model for this study. The decision rule, for Hausman Specification test is rejecting the null hypothesis when the p-value is significant (less than 0.05). Thus, as shown in Appendix 1 VI, the Hausman specification test for this study has a p-value of 0.0000 for the regression models. This indicates that p-value is significant and then the null hypothesis is rejected justifying as fixed effect model is appropriate for the given data set in this study.

4.4. Result of Regression Analysis

Under this section the regression results via stata 11 are presented. From the following regression outputs the beta coefficients may be negative or positive; the beta indicates that each variable's level of influence on the dependent variable. P-value indicates at what percentage or precession level of each variable is significant. R^2 values indicate the explanatory power of the model and in this study adjusted R^2 value which takes into account the loss of degrees of freedom associated with adding extra variables were inferred to see the explanatory powers of the models.

Empirical model: As presented in the third chapter the empirical model used in the study in order to identify the factors that can affect Ethiopian banks profitability was provided as follows:

$$NPLit = \beta0 + \beta1(LTD)it + \beta2(ROE)t + \beta3(ALR)it + \beta4(INFR)\ it + \beta5(GDP)it + \varepsilon it$$

Where;

➢ β0 is an intercept

➢ β1, β2, β3, β4, and β5 represent estimated coefficient for specific bank i at time t,

➢ LTD, ROE, ALR, INF and GDP represent Loan to deposit ratio, return on equity, Average lending rate, inflation rate and growth on gross domestic product respectively

➢ εit represents error terms for intentionally/unintentionally omitted or added variables. It has zero mean, constant variance and non- auto correlated.

Table 4.2: regression results through FEM

NPL	Coefficient.	Std. Err.	T	P>t
ROE	-0.061	0.0305	-2	0.045**
LDR	0.0455	0.0229	1.98	0.042**
ALR	-1.0551	0.4196	-2.51	0.001*
INF	-0.0664	0.0313	-2.12	0.038**
GDP	-0.2297	0.3624	-0.63	0.528***
_CONS	19.345	8.7793	2.2	0.031

No. of obs. = 80

R-squared = 0.6023

Adjusted R-squared = 0.5166

Prob> F =0.0001

F-statistic 9.54

rho .52541528 (fraction of variance due to u_i)

Source: own computations Via Stata 11 from NBE

Note: *significant at 1%, **significant at 5%

Therefore, based on the above estimation result, the following estimated regression function is obtained.

$$NPLit = 19.35 + 0.046(LTD)it - 0.06(ROE)t - 1.055(ALR)it - 0.066(INFR)it + \varepsilon it$$

Table.4.2. presented the regression result of nonperforming loan (NPL) as dependent variable and return on equity, Loan to deposit ratio, average lending rate, inflation rate and growth on real GDP as independent variables for the sample of ten commercial banks in Ethiopia. The goodness of fit (R-squared) value for the model is around 60%, suggesting that almost 60% variance in Ethiopia commercial banks NPLs is explained by all mentioned explanatory variables. And also R2 value show that the overall goodness of the model. Accordingly, the value of R^2 showing that model used in this study has good statistical health. Furthermore, Since F- statistics is designed to jointly test the impact of explanatory variables on dependent variables; F-statistics of this model has a p-

value of 0.0001 indicating rejecting of the null hypothesis. This implies that all selected explanatory variables can affect the level of NPLs in common.

From table 4.2 it can be seen that nonperforming loan, return on equity, Loan to deposit ratio, average lending rate and inflation rate are statistically significant factors and affecting the Ethiopian commercial banks nonperforming loan.

From the above computation the two bank specific variables ROE and ALR had coefficients of -0.0610 and -1.0551 respectively and affect nonperforming loan negatively, which means the one unit ROE and ALR increased/decreased have a 0.06 and 1.05 unit change on banks nonperforming loan to the opposite direction. However, LTD had positive impact on NPLs having a coefficient of 0.0455 which implies one unit change in LTD can result a change on NPLs rate by 0.0455 units in the same direction. Besides, from macroeconomic factors, average lending rate had negative impact on the level of NPLs having a coefficient of -1.0551 which indicates a one unit change (increase/decrease) in average lending rate can result a change on NPLs by 1.05 units in opposite direction. Besides, INFR had negative impact on NPLs. Whereas Growth on Real GDP had positive impact on the level of NPLs having a coefficient of -0.2297 which indicates one unit change in Real GDP Growth can result a change on NPLs by 0.23 units.

In terms of significance level (corresponding p-value), all explanatory variables had p-values of less than the selected significance levels (5%) except for real GDP growth. As shown in the above table 4.1, ALR had strong and statistically significant (p-value = 0.001) impact on the level of NPLs even at 1%. Besides, ROE, LDR and INFR had statistically significant (p-value = 0.045, 0.042 and 0.038 respectively) impact on the level of NPLs at 5%. However, GDP had no statistically significant impact at 5% significant level on the level of NPLs with a p-value of 0.528. Thus, opposing to the researcher`s expectation; GDP did not show any significant impact on the level of NPL of commercial banks in Ethiopia from year 2007-2014.

4.5. Discussions on Regression Results

The preceding sections present the overall results of the study. Thus, this section discusses in detail analyses of the results for each explanatory variables and their importance in determining nonperforming loan ratio in accordance with the above regression result. In addition, the

discussions analyses the statistical findings of the study in relation to the previous empirical evidences.

4.5.1. Determinants of Nonperforming Loan – Discussion

4.5.1. Return on Equity

The result of fixed effect regression model in table 4.2 indicated that return on equity have a negative impact on nonperforming loan, and statistically significant (p-value = 0.050) at 5%significant level. Thus, the result is in accordance with the first research hypothesis (return on equity has a negative impact on NPLs). This implies that every one percent change (increase or decrease) in bank's return on equity keeping the other thing constant has a resultant change of 0.06 on the nonperforming loan in the opposite direction. There are a number of studies found negative relationships between efficiency and non-performing loans. The result was consistent with the studies by Makri*et al*. (2014) and Boudriga*et al. (*2009) where aggregate country data was used, (Klein, 2013), (Shingjerji, 2013), (Ahmed and Bashir , 2013).

Contrary to the finding of 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.

4.5.1.2. Average lending rate and Non-Performing Loan

The regression result of fixed effect model in the above table 4.2 is inconsistent with the hypothesis developed in this study. The study hypothesized that there is a negative association between lending rate and NPLs of banks. Unlike the findings of (Sarat*et.al*, 2003)Ranjan and Chandra (2003) and Farhan *et al*.(2012), Louzis*et al*.(2010), Sakiru*et al*.(2011), (Serpil & Tomak, 2013), and Konfi (2012), the result of Fixed Effect Model in the above table 4.3 indicates statistically significant negative impact of lending rate on NPLs in Ethiopia. This negative sign indicates an inverse relationship between lending rate and NPLs. It implies that for one unit change in the banks' lending rate, keeping other thing constant had resulted 1.05 units change on the levels of NPLs in opposite direction.

This study confirms the finding of Saba *et al.* (2012), Ahmad and Bashir (2013), and Ali and Eva (2013) that argues negative effect of lending rate on the NPLs of banks. Thus, according to commercial banks in Ethiopia, change in lending rate had no direct impact on NPLs since change in lending rate has a limit by regulatory authorities. The main reason for this negative association between lending rate and NPLs for Commercial bank in Ethiopia is: First, higher lending rate curtail ability to borrow, which decreases the amount of loan and then reduce NPLs. In case, higher lending rate enable individuals with funds to start saving with the banks to earn on their funds but investors with the profitable projects feel unwilling to borrow and invest. Second, increasing the level of lending rate has maximum and minimum limit by itself. That means degree of increase in lending rate and amount of NPLs may not be equal. Rather, ability to repay debt depends on other factors like borrowers' source of income. That is due to mismatch between the time they got return from their investment and the time they repay their debts. In case, when lending rate increases at the time they got return on their investment, the borrowers' ability to repay their debt increase resulting reduction in NPLs.

4.5.1.3. Loan to deposit ratio and Non-Performing Loan

The coefficient sign of loan to deposit ratio shows that there is a positive relationship between banks nonperforming loan and loan to deposit ratio. Loan to deposit ratio had positive and statistically significant (p-value = 0.0455) at 5% significant level. The finding of this study was consistent with findings of (Swamy & Vighneswara, 2012), (Shingjerji, 2013)Because at the time of low loans to deposits ratio in order to earn more banks start lending even to the low quality borrowers and do not follow the standard loan allocation practices, which leads to the growth in NPLs. Therefore, the result implies that every one unit change (increase or decrease) in bank's loan to deposit ratio keeping the other thing constant has a resultant change of 0.045 unit on the nonperforming loan in the same direction. From the coefficient value loan to deposit ratio is a very important determinant of NPL in Ethiopian banking industry. So, the second research hypothesis (i.e. there is a positive and significant relationship between NPL and banks loan to deposit ratio) also fail to reject.

4.5.1.4. Non-performing Loan and 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 borrower's ability to service debt by reducing their real income. Nevertheless, in this study the coefficient estimate of inflation was negative and statistically significant at 5% significant level (P- value of 0.038). The negative coefficient estimate of inflation (-0.0664) indicates an inverse association with NPLs. That means an increase in inflation rate; lead a decrease in NPLs and vice versa. This study confirms the finding of (Badar and Yasmin , 2013) which argues negative effect of inflation rate on the NPLs of banks.

Theories argue that inflation rate and non-performing loan have positive relationship. Since market frictions lead to the rationing of credit, credit rationing becomes more severe as inflation rises. As a result, the financial sector makes fewer loans, resource allocation is less efficient, and intermediary activity diminishes with adverse implications for capital/long term investment. Though the magnitude of the coefficient of correlation between inflation and nonperforming loans is low, the sign is negative (-0.0664); unexpected rise in inflation under cyclical downturns is likely to negatively affect the performance of the banking sector and recovery of loans to private operators and investors.

Therefore, the finding is significant (p-value =0.38) the result disclosed that inflation rate has negative relationship with nonperforming loan. So, Inflation rate is an important determinant of NPL in Ethiopia commercial banks.

The inverse relationship between inflation and NPLs in ECBs is due to the fact that, in Ethiopia the maximum lending rate is determined by National bank of Ethiopia and ECBs are unable to adjust their lending rate in accordance with different factors such as time value of money, inflation and business risk. For instance, the average annual inflation rate in Ethiopia over the period of consideration was 11% with a maximum of 36.4%. Despite this fact, the average lending rate of ECBs never exceeds 12.75% over the sample period. This clearly indicates the lending rate in Ethiopia was far below from the market interest rate since ECBs were not allowed to adjust their lending rate to compensate the existing high inflation rate. In this general setting, it could be conclude that, the existing higher inflation rate in Ethiopia was in favor of borrowers since it can make debt servicing easier by reducing the real value of outstanding loans.

4.5.1.5. Real GDP Growth and Nonperforming Loan

The coefficient signs of real GDP growth rate show that, economic growth has a negative and statistically insignificant (p-value = 0528) at 5% significant level on the growth of NPL. However the previous literatures of (Nir & Klein, 2013), Selma M. et al(2013) (Makri Vasiliki, 2014) and (Bruna & Skarica, 2013) revealed that there is a negative significant relationship between Real GDP growth and NPL Unexpectedly the current econometric analysis suggest that real GDP growth is not the main driver of nonperforming loan ratio in Ethiopia banking industry.

This finding is also consistent with the findings of (Vighneswara and Swamy, 2012), (Serpil & Tomak, 2013). Finally the result also suggests that GDP growth rate is not the most important determinant factor for Ethiopia commercial banks NPL.

Table 4.3 Summary of Regression Results

Comparison of the Test Result with the Expectation

Explanatory variables	Expected sign & impact on liquidity	Actual sign & impact on liquidity	Decision
Return on equity	- ve and significant	- ve and significant	Accepted**
Loan to deposit ratio	+ve and significant	+ ve and significant	Accepted**
Average lending rate	-ve /+ve and significant	- ve and significant	Accepted*
Inflation rate	- ve/+ve and significant	- ve and significant	Accepted**
Real GDP Growth	- ve and significant	- ve and insignificant	Rejected

Chapter Five

Summary of Major Findings, Conclusions, and Recommendations

The preceding chapter presented results and discussion of the study, while this chapter will deals with conclusion and recommendation of the study based on the findings. Accordingly this chapter is organized into three sub-sections. Section 5.1 will be presented conclusion of the study and recommendation of the study will be presented under section5.2. Section 5.3 will be provide future research directions

5.1. Conclusion

The broad objective of this research was to investigate bank specific and macroeconomic determinants of NPLs in Ethiopian Commercial Banks. Non-performing loan can affect the ability of banks to play their role in economic development. As well as to investigate and verify the determinants of commercial banks nonperforming loan and how they affects the level of NPL in Ethiopian commercial banks, The analyses were made in line with the stated hypotheses formulated in the study. In doing so, previous studies on determinants of bank's NPLs have been reviewed and as per the literature NPLs of banks" usually expressed as a function of bank specific and macroeconomic determinants. Accordingly, this study includes three bank specific determinants (ROE, LDR and ALR) and two macroeconomic determinants (growth on real GDP and Inflation rate).

The panel data was used for the sample of ten commercial banks in Ethiopia from 2007 to2014 and presented by using descriptive statistics and the correlation and regression analysis for nonperforming loan was conducted. The model was tested for the classical linear regression model assumptions and fulfills assumptions of the CLRM. Fixed effect model/FEM/ was used based on based on hausman specification test. From the list of possible explanatory variables, only growth on real GDP become statistically insignificant and the rest four of them proved to be statistically significant. The results of models enable us to make following conclusions.

Bank profitability measured in terms of ROE had negative and statistically significant effect on the levels of NPLs. This implies effective management of commercial banks in Ethiopia on utilization of funds contributed by shareholders and investing on profitability sectors reduced the possibility of NPLs.

The findings also suggested a positive relationship among loan to deposit ratio and NPLs of Ethiopian commercial banks which was consistent with the prior expectation.

Inconsistent with the developed hypothesis lending rate confirmed negative and statistically significant with one percent significant level impact of lending rate on the level of NPLs. This implies factors like, higher lending rate limit ability to borrow, which reduces the amount of granted loans and NPLs too; borrower's source of income (when lending rate increases as the sometime borrower got return on their investment, their ability to repay become higher resulting in reduction of NPLs), increase in lending rate reduces the levels of NPLs for Ethiopian commercial banks.

From macroeconomic determinants annual inflation rate was found to be negative and statistically significant determinants of NPLs in Ethiopian commercial banks. This could suggest that the absence of adjustment on the lending rate (to compensate the inflation rate) enhanced the debt servicing capacity of borrowers by reducing the real value of the outstanding loans.

Generally, the finding of the study failed to reject four research hypotheses that indicate the relationship between bank's nonperforming loan and profitability, loan to deposit ratio, average lending rate and inflation rate. Whereas, the hypotheses indicating the relationship between bank's nonperforming loan and gross domestic product was rejected (had insignificant) impact on bank's NPL in Ethiopia. To this end, the research finding indicates that non-performing loans were a problem in Ethiopia and caused by both macro and micro economic factors. Therefore, the recommendations generated are a prescription for all banks in Ethiopia.

5.2. Recommendation

This study was intended to investigate the determinants of nonperforming loan on Ethiopian commercial banks; and hence on the basis of the findings of the study, the following recommendations were drown:

Commercial banks should develop detail credit procedures and policies with continual updating by including and taking into consideration the studied variables, should be expanded into full credit management including origination, borrower selection, loan approval, monitoring and problem management tailored to the needs of each bank.

Inflation and lending rate has an influential impact on the level of NPLs. The degree of increasing and decreasing the level of lending rate has its own limit as per the regulatory authorities of the country set by the NBE. It is imposed to overcome different costs and the exact lending rate is set by the individual commercial banks. Thus, is advisable for the banks to apply moderate lending rate and overcome its cost by increasing fees and commission charges on current accounts and issued letters for the customers. On the other hand inflation is determined by other factors out of the control of the banks management. It has its own impact on borrowers' selection and intern improves the status of nonperforming loans. In doing so commercial banks should set an appropriate lending rate by considering factors like overhead costs, cost of investment and adjust periodically which considers the industry level and macroeconomic factors like inflation rate and overhead costs.

5.3 Room for further research

Accordingly, the study employed only bank specific and macroeconomic factors affecting non-performing loans by using a panel data to the sample of only ten commercial banks. Hence, there are other variables other than the above ones that can determine banks nonperforming loan like industry level factors (market share, banking regulatory policies)

Therefore, the future researches should investigate by including primary data's on different variables and newly emerged banks.

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Appendices

Appendix 1: Tests for Multiple Regression and Panel Data

I.   Multicollinearity Test Using Variance Inflation Factor:
`. estat vif`

Variable	VIF	1/VIF
alr	2.31	0.432785
gdp	2.06	0.485927
inf	1.89	0.530373
ldr	1.60	0.626877
roe	1.10	0.911635
Mean VIF	1.79	

Source: NBE via Stata 11

Note: LTD for Loan to deposit ratio, ROE for Return on equity, ALR for Average lending rate, INF for Inflation rate and GDP for growth in real GDP rate

VIF greater than 10 and 1/VIF is less than 0.10 indicates the presence of multicollinearity. The result shows that, no multicollinearity problem since VIF less than 10 and 1/VIF is greater than 0.1

II.   Multicollinearity test using Pearson correlation matrix
`. pwcorr roe- gdp`

	roe	ldr	alr	inf	gdp
roe	1.0000				
ldr	-0.2951	1.0000			
alr	0.1908	-0.5725	1.0000		
inf	-0.0212	0.0787	-0.2555	1.0000	
gdp	-0.0921	0.2118	-0.3864	-0.4818	1.0000

III. Normality Test: Shapiro wilk test for normal distribution of residuals.

H0: Variables are normally distributed

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
residual	80	0.95477	3.105	2.482	0.00653

The null hypothesis states that the distribution of the residuals is normal; here we fail to reject null hypothesis, as long as a Shapiro-wilk test is insignificance. Then we conclude that residuals are normally distributed.

IV. Breusch-Pagan / Cook-Weisberg test for Heteroskedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
```
        Ho: Constant variance
        Variables: fitted values of npl

        chi2(1)      =      0.22
        Prob > chi2  =    0.6393
```

Since the result is insignificant rejecting alternative hypothesis becomes appropriate; that indicates the presence of heteroskedasticity, and accept null hypothesis which states there is constant variance (homoscedasticity).

V. Wooldridge test for Autocorrelation

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      9) =    10.435
          Prob > F =     0.0103
```

VI.   HausmanTest for Random Vs Fixed Effect

	─── Coefficients ───			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
roe	-.0609734	.0563492	-.1173226	.0208257
ldr	.0454969	.0732139	-.0277169	.0056461
alr	-1.055126	-1.046366	-.0087596	.
inf	-.066377	-.0664037	.0000268	.
gdp	-.2297013	-.1746327	-.0550686	.

```
                            b = consistent under Ho and Ha; obtained from xtreg
                 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

        Test:  Ho:  difference in coefficients not systematic

               chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                       =         68.58
             Prob>chi2 =       0.0000
             (V_b-V_B is not positive definite)
```

Hausman test was statistically significant. So, null hypothesis which states random effect is appropriate; was rejected and fixed effect model was selected.

VII.   Regression result via Fixed Effect Model

NPL	Coef.	Std. Err.	T	P>t	[95% Conf. Interval]	
ROE	-0.0609734	0.0304846	-2	0.045	-.1218553	.0000915
LDR	0.0454969	0.0229391	1.98	0.042	-.0003157	.0913096
ALR	-1.055126	0.4196495	-2.51	0.014	-1.893223	-.2170276
INF	-0.066377	0.0313209	-2.12	0.038	-.1289292	-.0038247
GDP	-0.2297013	0.3623808	-0.63	0.528	-.9534257	.4940231
_CONS	19.34502	8.779329	2.2	0.031	1.811493	36.87855

R-squared   0.6023

Adjusted R-squared 0.5166

F-statistic 9.54

No. of Obs. = 80

sigma_u   2.2270034

sigma_e   2.1165396

rho .52541528 (fraction of variance due to u_i)

F test that all u_i=0: $F_{(9, 65)}$ =   4.47

Prob> F = 0.0001

Appendix 2: Ratio data

BANKS	YEAR	NPL	ROA	ROE	LDR	ALR	INF	GDP
CBE	2007	14.52	2.18	30.00	30.00	10.50	15.80	11.80
CBE	2008	5.33	2.90	31.00	46.07	11.25	25.30	10.04
CBE	2009	3.66	3.50	40.01	48.07	12.25	36.40	10.57
CBE	2010	14.84	2.95	37.15	43.95	12.25	6.30	11.40
CBE	2011	0.86	3.04	48.46	42.43	11.88	18.10	11.40
CBE	2012	2.00	3.98	77.71	53.45	11.88	34.10	8.70
CBE	2013	4.99	3.43	72.83	46.95	11.88	13.50	9.82
CBE	2014	6.34	2.73	61.95	46.43	11.88	8.10	10.35
CBB	2007	17.06	3.01	35.22	100.53	10.50	15.80	11.80
CBB	2008	15.56	4.02	40.46	80.93	11.25	25.30	10.04
CBB	2009	11.45	3.28	30.57	75.85	12.25	36.40	10.57
CBB	2010	6.56	3.30	32.00	66.17	12.25	6.30	11.40
CBB	2011	17.72	2.58	25.00	61.66	11.88	18.10	11.40
CBB	2012	9.70	2.43	27.00	46.30	11.88	34.10	8.70
CBB	2013	10.00	2.20	24.00	45.85	11.88	13.50	9.82
CBB	2014	11.20	1.25	13.36	61.58	11.88	6.30	10.35
DB	2007	5.95	3.53	40.19	80.00	10.50	15.80	11.80
DB	2008	5.89	3.45	37.50	69.58	11.25	25.30	10.04
DB	2009	7.39	2.85	3.49	54.88	12.25	36.40	10.57
DB	2010	3.00	2.93	31.89	48.68	12.25	6.30	11.40
DB	2011	3.38	3.34	35.77	51.46	11.88	18.10	11.40
DB	2012	2.15	4.05	40.44	56.52	11.88	34.10	8.70
DB	2013	2.25	3.26	31.33	54.65	11.88	13.50	9.82
DB	2014	1.70	5.10	45.82	53.33	11.88	8.10	10.35
AIB	2007	7.36	4.22	38.78	80.72	10.50	15.80	11.80
AIB	2008	8.66	3.30	27.70	70.75	11.25	25.30	10.04
AIB	2009	5.78	2.50	21.20	54.67	12.25	36.40	10.57
AIB	2010	5.47	3.40	29.29	51.52	12.25	6.30	11.40
AIB	2011	14.00	4.00	32.10	51.48	11.88	18.10	11.40
AIB	2012	2.70	3.60	27.03	59.80	11.88	34.10	8.70
AIB	2013	6.04	3.80	28.00	61.46	11.88	13.50	9.82
AIB	2014	2.30	3.80	27.30	77.90	11.88	8.10	10.35
UB	2007	4.59	3.38	23.23	91.50	10.50	15.80	11.80
UB	2008	3.98	3.35	22.00	76.11	11.25	25.30	10.04
UB	2009	4.62	2.37	18.90	59.50	12.25	36.40	10.57
UB	2010	3.76	3.31	30.10	55.30	12.25	6.30	11.40
UB	2011	3.35	3.40	30.13	54.02	11.88	18.10	11.40
UB	2012	2.33	3.61	30.00	60.50	11.88	34.10	8.70
UB	2013	2.53	3.30	19.00	55.40	11.88	13.50	9.82
UB	2014	3.65	2.34	17.66	53.92	11.88	8.10	10.35
WB	2007	5.25	3.90	34.04	79.13	10.50	15.80	11.80
WB	2008	8.39	3.70	27.54	79.11	11.25	25.30	10.04
WB	2009	7.70	3.90	25.06	56.66	12.25	36.40	10.57
WB	2010	3.47	4.10	23.70	63.06	12.25	6.30	11.40

WB	2011	3.51	4.70	27.01	48.85	11.88	18.10	11.40
WB	2012	2.40	4.10	22.90	61.92	11.88	34.10	8.70
WB	2013	0.41	3.70	20.00	62.12	11.88	13.50	9.82
WB	2014	4.06	2.80	15.34	54.92	11.88	8.10	10.35
NIB	2007	5.56	3.28	21.41	96.70	10.50	15.80	11.80
NIB	2008	6.73	3.60	22.10	85.58	11.25	25.30	10.04
NIB	2009	11.16	3.60	23.16	67.36	12.25	36.40	10.57
NIB	2010	7.37	3.70	24.42	61.69	12.25	6.30	11.40
NIB	2011	5.04	4.00	23.61	53.64	11.88	18.10	11.40
NIB	2012	3.00	3.70	21.21	63.53	11.88	34.10	8.70
NIB	2013	0.30	3.44	18.75	68.26	11.88	13.50	9.82
NIB	2014	3.60	3.44	18.75	68.26	11.88	8.10	10.35
BOA	2007	10.54	2.15	16.65	84.71	10.50	15.80	11.80
BOA	2008	12.87	0.38	3.54	81.00	11.25	25.30	10.04
BOA	2009	14.75	2.06	21.40	60.28	12.25	36.40	10.57
BOA	2010	6.98	2.39	25.45	61.36	12.25	6.30	11.40
BOA	2011	3.97	2.67	29.04	54.58	11.88	18.10	11.40
BOA	2012	2.60	2.79	27.60	57.56	11.88	34.10	8.70
BOA	2013	2.80	2.36	21.48	55.34	11.88	13.50	9.82
BOA	2014	1.80	4.18	33.94	55.64	11.88	8.10	10.35
CBO	2007	0.17	0.74	1.90	86.30	10.50	15.80	11.80
CBO	2008	1.09	2.13	8.45	65.79	11.25	25.30	10.04
CBO	2009	2.50	0.28	1.55	75.57	12.25	36.40	10.57
CBO	2010	14.58	1.80	14.53	52.61	12.25	6.30	11.40
CBO	2011	3.60	2.21	21.74	40.49	11.88	18.10	11.40
CBO	2012	0.60	3.31	30.77	49.45	11.88	34.10	8.70
CBO	2013	1.70	4.01	36.74	47.39	11.88	13.50	9.82
CBO	2014	1.80	4.68	31.53	68.12	11.88	8.10	10.35
LIB	2007	0.11	-3.76	-7.41	61.48	10.50	15.80	11.80
LIB	2008	1.40	-0.20	-0.54	48.63	11.25	25.30	10.04
LIB	2009	0.27	0.34	1.45	66.82	12.25	36.40	10.57
LIB	2010	6.53	3.45	18.43	57.39	12.25	6.30	11.40
LIB	2011	6.41	2.76	14.71	52.13	11.88	18.10	11.40
LIB	2012	3.10	3.53	18.98	55.89	11.88	34.10	8.70
LIB	2013	2.95	4.12	22.65	62.59	11.88	13.50	9.82
LIB	2014	3.07	2.95	16.51	57.36	11.88	8.10	10.35