



**ADDIS ABABA UNIVERSITY
COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF MANAGEMENT**

**ASSESEMENT OF THE DETERMINANTS OF NON-PERFORMING LOANS
THE CASE OF COMMERCIAL BANKS IN ETHIOPIA**

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This study is my own work that has not been submitted for any degree or diploma program in this or any other institution.

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LIST OF ACRONYMS/ABBREVIATIONS

IMF	International Monetary Fund
NBE	National Bank of Ethiopia
SSA	Sub-Saharan African
CBO	Cooperative Bank of Oromia
NPL	Non-Performance Loans
ETB	Ethiopian Birr
GDP	Gross Domestic Product
ROE	Return on Equity
ROA	Return on Asset
AIB	Awash International Bank
NIB	Nib International Bank
BUIB	Buna International Bank
BOA	Bank of Abyssinia
DB	Dashen Bank
UN	United Bank
DW	Durbin-Watson
JB	Jarque-Bera
CLRM	Classical Linear Regression Model
WB	Wegagen Bank
OLS	Ordinary Least Square
ESS	Explained sum square
TSS	Total sum square
NPA	Nonperforming Asset
χ^2	chi-squared test

Abstract

The paper investigated the determinants of non-performing loans (NPLs) in commercial banks in Ethiopia in the period of 2007–2016. This study sought to explain the significance of interest rate, growth in GDP, inflation rate, exchange rate, real interest rate, ROA, ROE and loan growth rate on nonperforming loans in commercial banks in Ethiopia.. Explanatory research is conducted in order to identify the extent and nature of cause-effect relationships between dependent and independent variables. The study used secondary data collected from eight purposively selected commercial banks in Ethiopia. Econometric regression analysis was used in establishing the significance of the relationship. The paper found that the level of NPLs can be attributed to both macroeconomic conditions and banks' specific factors, though the former set of factors was found to have a relatively low explanatory power. From the macro determinants, Real interest rate has positive relationship with NPL which are statistically significant at 1% level of confidence. ROA and ROE from bank specific factors have negative and significant relationship with the NPLs in commercial banks in Ethiopia. The outcome of this project firstly would enable commercial banks adopt workable strategies, benefit to the Ethiopian banking and non-banking financial sectors as a whole, and serve as a source of reference for other related research works in the future. Government Expenditure, Import & export of the country, foreign currencies availability, political stability, and competition in banking industry are recommended for further studies.

Key words: *Nonperforming loan, Return on asset, Ethiopian commercial Banks, Real GDP, crossectional data, Inflation.*

CHAPTER ONE: INTRODUCTION

1.1. Background of the Study

The operations of individual banks (how they acquire, use, and manage funds to make a profit) are roughly similar throughout the world. In all countries, banks are financial intermediaries in the business of earning profits. The main banking business is accepting the deposits and utilizing it for lending to industry. Lending business is generally encouraged because it has the effect of funds being transferred from the system to productive purposes which results into economic growth. The debtor take the funds from the bank in the form of credit and they have to pay back the principal amount with the interest to the bank as a result, the bank gets the profit in the form of interest and again this profit is reinvested leading to the growth of the economy. Because banking plays such a major role in channeling funds to borrowers with productive investment opportunities, this financial activity is important in ensuring that the financial system and the economy run smoothly and efficiently Mishkin F. and Stanly G (2012).

A healthy and vibrant economy requires a financial system that moves funds from people who save to people who have productive investment opportunities. I.e. Banks are financial institutions that accept deposits and make loans. Included under the term *banks* are firms such as commercial banks, savings and loan associations, mutual savings banks, and credit unions (Mishkin, F 2012) However, lending carries credit risk, which arises from the failure of borrower to fulfill its contractual obligations either during the course of a transaction or on a future obligation. Due to the nature of their business, commercial banks expose themselves to the risks of default from borrowers.

According to NBE's definition (SBB/43/2008), Non Performing Loans are ~~Loans~~ or Advances whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with contractual repayment terms of the loan or advance is in question."

A loan is non-performing when payments of interests and principal are past due by 90 days or more, or at least 90 days of interest payment have been capitalized, refinanced or delayed by agreement, or payments are less than 90 days overdue, but there are other good reasons to doubt that payment will be made in full (IMF, 2009). NPLs can be treated as undesirable outputs or costs to loaning banks which decreases the bank's performance.

There are two main ways through which NPLs could affect economic recovery. Firstly, banks burdened with NPLs may be ill-placed to extend fresh credit. Secondly, overextended borrowers face reduced incentives to invest and assets remain under their control rather than being reallocated to more productive users (IMF, 2009).

Why borrowers became defaulter? What causes loan to be non-performing loan? The study aims to evaluate the determinants of non-performing loans in the commercial banks in Ethiopia by looking at bank-level data and macroeconomic indicators

As such, it will contribute to the existing literature by providing evidence on the causes of bad loans in Ethiopia. The study employed firm-level data which are rarely used by researchers who study non-performing loans. Therefore, the paper extends the literature on non-performing loans and utilized both macroeconomic and bank specific variables. Apart from contributing to the literature, the paper may also have important practical implications for commercial bankers and bank regulators in the Ethiopian banking system. For instance, the findings may be used to develop a framework for measuring and assessing credit risk – an important element of study for the financial stability unit of a central bank.

1.2. Statement of the Problem

As mentioned above, the main banking business is accepting deposits and utilizing it for lending to industry. Lending business is generally encouraged because it has the effect of funds being transferred from the system to productive purposes which results into economic growth. The debtor take the funds from the bank in the form of credit and they have to pay back the principal amount with the interest to the bank as a result the bank gets profit in the form of interest and again this profit is reinvested leading to the growth of the economy

The sustainability of financial institutions depends largely on their ability to collect their loans as efficiently and effectively as possible. In other words to be financially viable or sustainable, financial institutions must ensure high portfolio quality based on uninterrupted repayment.

Financial stability is considered as vital of sustained and rapid economic progress. Among various indicators of financial stability, banks' non-performing loan assumes critical importance since it reflects on the asset quality, credit risk and efficiency in the allocation of resources to productive sectors. A common perspective is that the problem of banks' non-performing loans is

ascribed to political, economic, social, technological, legal and environmental factors across countries (Das and Ghosh (2003)). Therefore, if the financial system does not work properly, their problems have a great impact on the whole economy. For this reason, policymakers, regulators, academics and practitioners pay close attention to the soundness and stability of this sector in every country.

Loan portfolio constitutes the largest operating assets and source of revenue of most banks in Ethiopia. However, some of the loans given out become non-performing and adversely affect the profitability and overall financial performance of the lending institutions. The economic and financial costs of these impaired loans are significant. Potentially, these loans may negatively affect the level of private investment, increase deposit liabilities and constrain the scope of bank credit to the private sector through a reduction of banks' capital, accumulation of losses and related increased provisions to compensate for these losses.

Non-performing loans are dangerous not only for the economy of one country but also for the whole world as we have seen the financial crisis created by these loans in East Asian countries, America and Sub-Saharan Africa (Wan Yusoff, & Dahalan, 2011). Ethiopia has not been exempted from the problem of non-performing loans which had negative effects both to the lending institutions and the economy as a whole. In Ethiopian financial regulation system, all banks in the country are required to keep the non performing loan ratio below 5 % (NBE, 2008). This legally required limit is very important to make the country's financial institution more stable and safe.

However many lending institutions in Ethiopia are confronted with the challenge of rising non-performing loan despite efforts are employed to keep at minimum as much as possible. For example the ratio of nonperforming loans of Zemen Bank (8%) on June 30, 2014, Cooperative bank of Oromia (5.6%) on June 30, 2016, Bank of Abyssina (5.37%) as of June 2015, Buna Bank(5.9) on June 30, 2016, Lion Bank (5.3%) on June 30, 2014 are some of the private financial institutions with NPLs problem in their loan portfolio in recent years (Bank's annual report 2014/15 and 2015/16).

To address the problem, researches have been undertaken in Ethiopia on problem of Non-performing loan on Ethiopian commercial banks. For example, Habtamu (2015) “factors affecting NPL in Ethiopian Private Banks” find out that weak credit analysis, poor credit monitoring, inadequate risk management, lenient credit policy, bank size and loan diversion determine NPLs in private banks, Wondimagegn (2012) “bank specific determinants of NPL in Ethiopian banks” concluded that poor credit assessment, credit monitoring, unfair competition between bank as determinants of NPLs in banks in Ethiopia, and Tihitina (2009) on “the legal aspect of recovering after the occurrence of NPL”, all are indicated the presence of NPL in Banks and came up with more similarly bank specific factors as determinants of NPLs in banks in Ethiopia . But still the problem of Non-performing Loans in Commercial Banks in Ethiopia is the major issue. However, Anisa (2015) Determinants of Non-performing loan propose ROA, ROE, Unemployment, and Exchange rate as future research direction.

From the above research studies in Ethiopia on NPLs, none of the them have talked about the effect of bank’s performance indicators variables like ROA, ROE, and Macroeconomic factor like Exchange rate between birr and US dollar which cause changes to the level of NPL’s in commercial banks in Ethiopia like other variables; interest rate, growth in GDP, inflation in the economy.

Thus, the researcher aimed to determine the root causes of Non-Performing loans in Commercial Banks in Ethiopia. So the researcher wanted to see the determinants of Non-Performing loans, by incorporating macroeconomic variables and bank specific variables by using quantitative type research.

1.3. Objectives of the study

1.3.1. General objective

The general objective of the study is to investigate the determinants of nonperforming loan in Commercial Banks in Ethiopia.

1.3.2. Specific objectives

Specifically, the objectives of the study included the following;

- ❖ To examine the effect of GDP growth on NPL of commercial banks in Ethiopia.
- ❖ To examine the effect of rapid loan growth on NPL of commercial banks in Ethiopia.

- ❖ To examine the effect of inflation on NPL of commercial banks in Ethiopia.
- ❖ To examine the effect of exchange rate on NPL of commercial banks in Ethiopia.
- ❖ To examine the effect of Real interest rate on NPL of commercial banks in Ethiopia.
- ❖ To examine the effect of ROA of bank on NPL of commercial banks in Ethiopia.
- ❖ To examine the effect of ROE of banks on NPL of commercial banks in Ethiopia.

1.4. Research Questions

The study attempted to address the following specific questions:

- ❖ Does real GDP growth affects the level of non-performing loan?
- ❖ Does inflation growth rate determine non-performing loans?
- ❖ Does exchange rate determines loan default?
- ❖ Does real interest rate affects the level of non-performing loan of commercial banks?
- ❖ Does rapid credit growth leads to non-performing loans?
- ❖ Does ROA affect level of non-performing loan?
- ❖ Does ROE determine non performing loan?
- ❖ What measures can be employed to control loan default?

1.5. Significance of the study

The loan portfolios of the lending institutions are major assets that generate a significant amount of interest income. It plays a critical role in determining the financial performance of commercial banks and it can therefore be said that the healthier the loan of the commercial banks, the better its financial performance will be. In the light of the importance of the health of the loan portfolio, it is essential that a study be conducted to identify the determinants of nonperforming loans in the commercial banks in Ethiopia. The outcome of this project firstly would enable commercial banks adopt workable strategies to control the problem of a growing non-performing loan portfolio in the institution and thereby improve its financial performance and profitability.

Secondly, the project would be of benefit to the Ethiopian banking and non-banking financial sectors as a whole since the financial institutions in the country operate within the same environment and deal with customers of similar characteristics. Thirdly, the project could serve as a source of reference for other related research works in the future. Thus, the study would

contribute immensely to the improvement of NPL of commercial banks which play a significant role in the economy.

1.6. Scope of the study

The study focuses on the non performing loans in the Financial Institution in Ethiopia with particular focus on eight Commercial Banks in Ethiopia. Thus, the research seeks to establish the causes of poor loan repayment performance by the customers of these commercial banks. The reason for limiting the scope to eight Commercial Banks is that they possess all the unique characteristics of all Banks, engages in almost all the activities undertaken by the other banks in the country and also they are located in almost all the regions in Ethiopia. Additionally, banks credit activities of Commercial Banks in Ethiopia covers several sub- sectors of the economy and could be studied and the findings reasonably generalized as what exist in all banks in Ethiopia.

Generally, this research work looks at the various categories of bad loans, the possible causes of bad loans, the impact of bad loans on the operations of Banks in Ethiopia and the economy as a whole. The period of assessment has also been limited to 2007-2016; this is because of most of the private commercial banks in Ethiopia established & started after 2007 and only ten private commercial banks has published data for ten years. Additionally, the last ten years are characterized by high figure of NPLs in the banks. Therefore, this is to ensure that the result reflects the current trend of NPL in the operations of Commercial Banks in Ethiopia.

1.7. Limitations of the study

All the necessary data may not be collected due to the wide distribution of outlying bank branches, confidentiality of data because most financial institutions will not readily disclose information to researchers for fear of breach of Secrecy and unwillingness to provide the right information by respondents in the process of collecting the relevant data.

In addition, respondents delay in giving the required data, and a few respondents fail to respond to requests which may affect the quality and generalization of this survey. Even though the banks in the country share common characteristics and face similar challenges, there is still the possibility that some aspects regarding the topic may not be discussed if those aspects are peculiar with the commercial banks that are not covered in the study.

A sample and not the entire population of commercial banks in Ethiopia were dealt with by relying on published annual reports and financial statements.

1.8. Organization of the research paper

The study was organized in a way of constituting five sections. The first section is an introductory part of the survey which includes: background of the study, the statement of the problem, the research questions and objectives of the study, the significance of the study, scope and limitation of the study and the organization of the research paper. The second section constituted review of literatures on the Evolution of Financial institution in Ethiopia, Loan classification, definitions and causes of NPLs, and the trends of NPL and the challenges facing commercial banks in Ethiopia. This section discussed briefly about the determinants of NPLs, which can be broadly defined as factors pertaining to bank-specific and macroeconomic and policy-related conditions. These variables are by no means exhaustive, but they sufficient to provide a useful framework for analyzing the dynamics of NPLs in the Ethiopian banking sector. Accordingly, the expected impacts of these variables were described.

The third section comprised the methodology of the study i.e. the target population, the sample size and sampling technique, the research instrument and data collection procedures are outlined. The data summarization, analysis, and interpretation part has been given in the fourth section. Finally, the last section provides conclusion and recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1.Theoretical and Conceptual literature review

2.1.1. Loans Classification and Provisioning Practice of Ethiopian Banks

The current classification and provisioning practice of Ethiopian banks has been framed by the National Bank of Ethiopia's directives. For loans with fixed repayment terms, the NBE's directive and the current practice of the banks are based on an objective indicator of collectability i.e. the period that payments of interest and principal are past due.

The NBE Directive No SBB/43/2008 laid down the framework for the loan classification system for all banks operating in the Ethiopian banking industry. The directive is applied to all banks irrespective of their ownership and purpose of establishment (i.e. development and commercial banks as well as government and private banks).

The NBE's guideline utilized a 5-grade (pass, special mention, substandard, doubtful and loss) loan classification framework to classify loan accounts. In addition, it highly relied on delinquencies (measured as the numbers of days or month's loan repayment are past due) as main benchmark to classify loans. Thus, loans with pre-established repayment programs are classified as non-performing loans when principal and/or interest is unpaid for 90 days or more. In addition, for loans without repayment terms when the account remain outstanding, exceeded its limit, interest due uncollectible and inactive for 90 consecutive days or more. Besides, the directive has established criteria to classify overdraft facilities based on their lowest debit performance. This can give an indication that the regulator directive has set objective criteria for classifying loans providing the discretion of\ subjective judgment to its on-site examiners. The directives have also established a framework for the treatment of renegotiated loans and advances and multiple loans and advances despite ambiguities on some of the standards.

- **Pass:** An asset is classified as 'Pass' if there are no outstanding arrears and the obligor is expected to continue to comply with all terms of the loan contract; there being no reason to believe that the entity will be, subject to risk of loss. Loans or advances in this category are fully protected by the current financial and paying capacity of the borrower and are not subject to criticism.

- **Special Mention:** An asset is classified as ‘Special Mention’ if potential weaknesses exist in the obligor’s financial position and/or the collateral pledged. Loans or advances with pre-established repayment programs past due 30 days or more, but less than 90 days.
- **Substandard:** An asset should be classified as ‘Substandard’ if it has one or more well-defined weaknesses that make the full collection of the principal and interest questionable, especially when the obligor’s financial condition, including net worth and/or repayment capacity, is unfavorable and is deteriorating; the pledged collateral, if any, is insufficient or is deteriorating; and/or if an actual breach of contract has occurred. Loans or advances with pre-established repayment programs past due 90 days or more, but less than 180 days.
- **Doubtful:** An asset is classified as ‘Doubtful’ when weaknesses exist which make collection or repayment in full highly questionable and improbable based upon currently existing circumstances, conditions, and the estimated recoverable amount of the pledged collateral, if any. Loans or advances with pre-established repayment programs past due 180 days or more, but less than 360 days
- **Loss:** At the time of classification, the asset is deemed Loss if it is uncollectible and of such little value that it should not be included on the books of account and financial statements of the licensed institution. Loans or advances with pre-established repayment programs past due 360 days.

2.1.2. Non-Performing Loans

Loans constitute the primary source of income of banks. As any business establishment a bank also seek to maximize its profit. Since loans are more profitable than any other assets, a bank is willing to lend as much of its funds as possible. But banks have to be careful about the safety of such advances. Bankers naturally try to balance the issue of maximizing profit by lending and at the same time manage risk of loan default as it would impair profit and thereby the very capital. Thus a bank needs to be cautious in advancing loans as there is a greater risk which follows it in a situation where the loan is defaulted. In other words loan loss or defaulted loans puts a bank in a difficult situation especially when they are in greatest amount. Despite the fact that banks hold security for the loans they grant they cannot be fully be certain as to whether they are paid or not. It is when such risks materialize that loans turn to be non- performing. The concept of non-

performing loans has been defined in different literatures. According to Patersson and Wadman (2004), non- performing loans are defined as defaulted loans which banks are unable to profit from. They are loans which cannot be recovered within stipulated time that is governed by the laws of a country. According to the International Monetary Fund (IMF, 2009), a non- performing loan is any loan in which interest and principal payments are more than 90 days overdue; or more than 90 days worth of interest has been refinanced. Non-performing loans generally refer to loans which for a relatively long period of time do not generate income; that is the principal and/or interest on these loans has been left unpaid for at least 90 days (Fofac, 2009). Non-performing loans are further defined as loans whose cash flows stream is so uncertain that the bank does not recognize income until cash is received, and loans those whose interest rate has been lowered on the maturity increase because of problem with the borrower (Machiraju, Undated). HR Machiraju expresses non-performing loans as a leading indicator of credit quality. Generally, in developing and underdeveloped countries, the reasons for default have a multidimensional aspect. Various researchers have concluded various reasons for loan default. Literature categorizes determinants of NPL to macroeconomic and bank specific factors. The paragraphs that follow discuss macroeconomic determinants of nonperforming loans.

Knowledge of NPLs is important because it affect the financial intermediation role of commercial banks which constitutes the banks' main source of their income, and ultimately, the financial stability of an economy (Klein, 2013). For this reason, NPLs have increasingly attracted attention recognizing that a consequence of large amount of NPLs in the banking system is bank failure as well as a symptom of economic slowdown (Lata, 2014).

This is largely because the financial performance of any commercial bank is measured in terms of profitability and NPLs have a direct adverse impact on the bottom line due to the provisions which the banks are forced to make on account of the NPLs (Balasubramaniam, 2013).

Other researchers have commented that an increase in NPLs rate is a reflection of the failure of credit policy (Saba, Kouser and Azeem, 2012). Khemraj and Pasha (2012) explain that high percentages NPLs are often associated with performance problems of banks and financial crises in both developing and developed countries. Fofack (2005) associates the occurrence of banking crises with a massive accumulation of NPLs and further observes that the NPLs account for a significant portion of total assets of insolvent banks and financial institutions.

2.1.3. Direct Consequences of Non-Performing Loans

Economic development will always be in its infancy if sufficient capital cannot be formed. Capital formation is basically the function of thrift organizations, like banks and other financial institutions, to motivate the households to save from their earnings. These savings should be utilized in economic processes.

Economists have identified at least three broad reasons for saving; life cycle saving: Saving to meet long -term objectives such as retirement, college attendance, or for the purposes of a home; precautionary saving: savings for protecting against unexpected setbacks such as the loss of a job or a medical emergency; bequest saving: Saving done for the purpose of leaving an inheritance. Along with household savings, there is another form of saving investment that basically comes from corporation.

Savings can be held in different forms as: financial assets, stores of value, as well as informal financial assets such as savings in informal financial institutions. Getting the small savings from the households, financial institutions form large capital so that it can be invested in the development of various sectors like industry, business, development and others. When saving gets invested rightly it works for the economic development. But if money is wasted wrongly, then it does not work for economic development. So investments have both positive and negative consequences. If the invested funds can be captured timely, it can again form new capital creating a good option of reinvestment or consumption.

Both these reinvestments and consumption functions create a positive impact on the economy, because economy gets some value added jobs to do. Apparently, it may seem that it's good so far as economic development is concerned, as the money remains invested in the economic process. But the reality is that the funds may fail to achieve its ultimate target, it may be unutilized or underutilized or even in extreme case, the funds may flow out of the economy for example due to non-performing loans. Then the loss will be a total loss both to the investing authority and to the society as well. Thus it will lead the economy to be stagnant for the time being, and if not checked, forever. It will also accelerate the path of being and remaining poor for the time being.

2.1.4. NPL Theories

- **Agency Theory**

Agency theory has its origins in the 1960s and 1970s by Stephen Ross and Barry Mitnick, who were responsible for economic and institutional theory of agency respectively (Ross, 1973). Agency theory extends the analysis of the firm to include separation of ownership and control, and managerial motivation (Eisenhardt, 1989). In the field of corporate risk management agency issues have been shown to influence managerial attitudes toward risk taking and hedging, (Smith and Stulz, 1985). Theory also explains a possible mismatch of interest between shareholders, management and debt holders due to asymmetries in earning distribution, which can result in the firm taking too much risk or not engaging in positive net value projects, (Mayers and Smith, 1987). Consequently, agency theory implies that defined hedging policies can have important influence on firm value (Fite and Pfleiderer, 1995). The latter hypotheses are associated with financing structure, and give predictions similar to financial theory.

- **Deflation Theory**

The first is deflation theory (Fisher, 1933), which suggests that when the debt bubble bursts the following sequence of events occurs; debt liquidation leading to distress selling and contraction of deposit currency, as bank loans are paid off. This contraction of deposits cause a fall in the level of prices, which leads to greater fall in the net worth of business, hence precipitating bankruptcies which leads the concerns running at a loss to make a reduction in output, in trade and in employment of labour. The cycles cause complicated disturbances in the rates of interest and a fall in the money value. The complicated disturbances described above can be summed as both external and internal forces (macro and micro factors) influencing state of over-indebtedness existing between, debtors or creditors or both which can compound to loan defaults.

- **Ownership Structure Theory**

The third theory, ownership structure theory was pioneered by Jensen (1976) integrated the elements of theory of property rights, Ronald (1937), the theory of agency, Ross(1973) and Mitnick (1974) and the theory of finance, Minsky (1974). The theory explains why highly regulated industries such as public utilities or banks have higher debt-equity ratios for equivalent

levels of risk that the average non-regulated firm. Jensen (1976) argues that, —ownership structure rather than —capital structure is the crucial variables to be determined, not just the relative amounts of debt and equity but also the fraction of the equity held by the manager. Relating to this study, the Kenya banking industry is composed of various categories of banks based on different ownership structure with different percentage in shareholdings. Ownership structure theory is appropriate for this study in that NPL levels are investigated on basis of bank ownership structure dependence.

2.1.5. Global Perspective of NPLs

A major problem being observed all over the world in the banking sector is problem of bad loans. First step of building a stable and strong financial system is to minimize non-performing loans. According to World Bank (2014), non-performing loans as proportion of total loans is 24.6 % for Ireland, 31.3 % for Greece, 9.5 % for Egypt, 6% for Russia, 3.6% for South Africa, 3.2% for USA, 2.9 % for Brazil and 1% for China. Non-performing loans have been huge concern for all the nations across the globe.

A review of the global perspective on the effect of NPLs reveals a consistent pattern of NPL trend, especially, in light of the pre and post global financial crisis. Evidence from Asia indicates that there was more than threefold increase in the volume of NPLs in Indonesian banks in the period leading up to the financial crisis (Cortavarria et al, 2000) and over sixty banks collapsed during the crisis. Karim, Chan, Hassan, 2010, indicate that in both Malaysia and Singapore, growth and innovation was constrained by banks which faced the accumulation of NPLs which eroded their capital.

In the Middle East, according to Espinoza and Prasad (2010), the global crisis exposed the vulnerabilities of the banks in the Gulf Cooperation Council to varying degrees. Gulf Cooperation Council countries are experienced significant banking credit between 2003 and 2008. The favorable macroeconomic environment preceding the global crisis had been conducive to favorable credit conditions and lower NPLs. In 2009, the NPLs rose sharply and credit stagnated, causing worries that economic recovery could be stagnated by credit constraints. NPL levels increase as the economic situation deteriorates and interest payments rise. Conversely, deterioration in banks' balance sheets may feed back into the economy because

banks will tighten credit conditions, especially if there remains uncertainty in the valuation of projects and of assets.

Krueger and Tornell (1999) attribute the credit crunch in Mexico after the 1995 crisis partially to NPLs. They point out that banks were burdened with credits of negative real value, thereby reducing the capacity of the banks in providing fresh fund for new projects. In Asia, both Malaysia and Singapore, growth and innovation has been constrained by banks which faced the accumulation of NPLs which eroded their capital (Karim et al, 2010).

In South America, Argentina experienced domestic credit growth of 36.14 percent during the second quarter of 2012, while Brazil saw domestic credit growing by 13.36 percent during the third quarter of 2012. These growth rates were not accompanied by significant increases in NPLs at least not for Argentina, Brazil and Mexico. Bréard, Blancas, Correa and Arbe (2014) comment that asset quality metrics in South America pointed towards a record-low level of NPLs which reached 3.0 percent of total loans.

The Mexican banking sector was well capitalized; however, the NPL ratio increased to 3.4 percent in December, 2013, above the 2.5 percent registered a year earlier, due to financial problems among major home builders. In Colombia, the NPL ratio rose modestly, reaching 2.1 percent in October, 2013 from 1.9 percent from previous year. In Venezuela, the local credit context remained stable. Based on official data, credit growth (only in the banking system) accelerated whilst the NPL ratio decreased to 0.6 percent in July, 2013 from 0.9 percent the previous year.

2.1.6. Determinants of Nonperforming Loans

Literature identifies two sets of factors to explain the evolution of NPLs over time. One group focuses on external events such as the overall macroeconomic conditions, which are likely to affect the borrowers' capacity to repay their loans, while the second group, which looks more at the variability of NPLs across banks, attributes the level of non-performing loans to bank-level factors. Empirical evidence, however, finds support for both sets of factors.

This section discusses briefly about the determinants of NPLs, which can be broadly defined as factors pertaining to bank-specific as well as macroeconomic and policy-related conditions.

These variables are by no means exhaustive, but they suffice to provide a useful framework for analyzing the dynamics of NPLs in the Ethiopian banking sector. Accordingly, the expected impact of these variables can be described as follows:

2.1.6.1. Macroeconomic Determinants of Nonperforming Loans

Several papers in the banking literature examine the relationship between macroeconomic environment and loan quality. In this line of research, it has been hypothesized that an expansionary phase of the economy features relatively low NPLs, as both consumers and firms face a sufficient stream of income and revenues to service their debts. As the booming period continues, however, credit is extended to lower-quality debtors and subsequently, when recession sets in, NPLs increase. Indeed, Carey (1998) argues that “the state of the economy is the single most important systematic factor influencing diversified debt portfolio loss rates”. It focuses on external events such as the overall macroeconomic conditions, which are likely to affect the borrowers’ capacity to repay their loans.

The macroeconomic determinants of the quality of banks’ loans have been area of various researchers during the past two decades. The literature on the major economies has confirmed that macroeconomic conditions matter for credit risk. These literatures among others have investigated the linkage between macroeconomic factors like GDP, inflation, real interest rates, unemployment etc. and loan performance. The paragraphs that follow critically review the existing literature on the major macroeconomic factors that have bearing on Nonperforming loans

2.1.6.1.1. Growth in Gross Domestic Product (GDP)

Basel (2013) using estimation technique method and panel data of 75 countries over ten year period from 2005 to 2010 studied the macroeconomic determinants of non-performing loans. The Analysis presented that real GDP growth was the main driver of non-performing loan ratio. There is a significant empirical evidence of negative association between growth in gross domestic product and non-performing loans (Salas and Suarina, 2002; Fofack, 2005). If we look into the explanation of this negative relationship provided by the literature we find that growth in the gross domestic product usually increases the income which ultimately enhances the loan payment capacity of the borrower which in turn contributes to lower bad loan and vice versa (Khemraj and Pasha, 2009).

2.1.6.1.2. Inflation

Kiayai (2003) argue that the poor fiscal policy had resulted to high inflation rates and that this could be one of the contributors of NPLs. Inflationary expectation is a factor that is embedded in the interest rate. Interest will remain high if investors believe that the government will introduce inflation in future by adding money in circulation through extended credit from the central bank. There is an empirical evidence of positive relationship between the inflation in the economy and non-performing loans (Khemraj and Pasha, 2009, Fofack 2005). While Nkusu, (2011) has explained that this relationship can be positive or negative according to the author inflation affects loan payment capacity of borrowers positively or negatively, higher inflation can enhance the loan payment capacity of borrower by reducing the real value of outstanding debt; moreover increased inflation can also weaken the loan payment capacity of the borrowers by reducing the real income when salaries/wages are sticky, moreover by highlighting the role of inflation in the presence of variable interest rate.

Nkusu further explains that in this scenario inflation reduces the debt servicing capacity of the loan holders as lenders adjust the lending interest rates to adjust their real return. So according to literature relationship between inflation and non-performing loans can be positive or negative depending on the economy of operations.

2.1.6.1.3. Exchange Rate

As far as relationship of the exchange rate is concerned literature provides mixed reviews. According to Khemraj and Pasha (2009) there is a positive relationship between real effective exchange rate and non-performing loans. An appreciation in exchange rates may have different implications i.e. it can adversely affect the loan payment capacity of export oriented firms (Fofack, 2005) on the other hand it can positively affect the loan payment capacity of those borrowers who borrow in foreign currency, the relationship between nominal effective exchange rate (includes inflation) and non-performing loans is indeterminate. Macro and banking stability are closely linked, so that what happens in one affects the other. The evidence for most countries suggests that, except where the banks are state owned or heavily state controlled, instability generally starts in the macro economy and spills over into the banking sector. The resulting

banking instability, in turn, feeds back and amplifies the macro instability. Thus, to enhance overall stability in the economy, it is necessary both to pursue successful contra cyclical macroeconomic policy and to reduce the fragility of banking relative to the magnitude of macro shocks that may be expected in the particular economy (Tandon Committee, 1998). Summing up, the existing empirical evidence shows, quite convincingly, that favorable macroeconomic conditions, such as sustained economic growth, low unemployment and interest rates, tend to be associated with a better quality of bank loans; under favorable economic circumstances, borrowers receive sufficient streams of income and meet their debt obligations more easily. Furthermore, these results are robust to different empirical methodologies and hold across countries.

2.1.6.1.4. Real Interest Rate

Lending rates/interest rates are one of the primary economic determinant of non-performing loans/bad loans. An increase in interest rate weakens loan payment capacity of the borrower therefore non-performing loans and bad loans are positively correlated with the interest rates (Nkusu, 2011). As far as interest rate policy is concerned it plays very important role in NPLs growth rate in a country/economy, Hoque and Hossain (2008) examined this issue and according to them non-performing loans are highly correlated with the high interest rates which enhances the debt burden of the borrowers and causes loan defaults.

Financial institutions facilitate mobilization of savings, diversification and pooling of risks and allocation of resources (Collins et al., 2011). However, since the receipts for deposits and loans are not harmonized, intermediaries like banks incur certain costs (Ngugi, 2001). They charge a price for the intermediation services offered under uncertainty and set the interest rate levels for deposits and loans. The disparity between the gross costs of borrowing and the net return on lending defines the intermediary costs which include information costs, transaction costs, administration, default costs and operational costs (Rhyne, 2002). Interest rate spread is well-defined by market microstructure characteristics of the banking sector and the policy environment (Ngugi, 2001). Nkusu (2011) listed several reasons for high interest rate spread which included: lack of sufficient competition, diseconomies of scale due to small size of markets, high operating and fixed costs, high transportation cost of funds due to expensive telecommunications, existence of regulatory controls and perceived market risks.

Espinoza and Prasad (2010) examined the macroeconomic determinants of non-performing loans in the GCC banking system according to them high interest rates increases loan defaults but they did not find statistically significant relationship. Bloem and Gorter (2001) studied causes and treatment of NPLs, according to them frequent changes in the interest rate policy causes an increase in the bad loans. Asari, et al. (2011) also found significant relationship between loan defaults and interest rates they also found that an increase in loan defaults also causes asset corrosion of banks and subsequently capital erosion. According to Dash and Kabra (2010) the banks with aggressive lending policies charging high interest rates from the borrowers incur greater non-performing loans. Collins and Wanjau (2011) also found interest rate as a primary factor boosting non-performing loans.

Various researchers have given a variety of findings about this relationship between Interest rate and NPLs in banks. According to some researchers high interest rate has a significant and positive relationship with Non- Performing Loans. They are of the view that when banks increase interest rate, there is an additional payment burden on borrowers resulting in increased defaults (Stiglitz and Weiss, 1981; Reddy, 2002; Boyd and Nicolo, 2005; Keeton and Morris, 1987; Fofack, 2005; Collin- Dufresne & Goldstein, 2001; Asari et al, 2011). Some of studies have also shown a weaker or insignificant relationship between interest rate and Non-Performing Loans (Kaplin et al, 2009; Patnaik and Shah, 2004; Espinoza and Prasad, 2010). The study of Sinkey (2002) shows that increase in interest rate negatively impacts the loan defaults. Similarly the study of Rajan and Dhal (2003) indicates a significant association of high cost of borrowing and Non-Performing Loans (NPLs).

2.1.6.2. Bank Specific Determinants

There are factors which look more at the variability of NPLs across banks, attribute the level of non-performing loans to bank-level factors. The literature identifies two sets of factors to explain the evolution of NPLs over time. One group focuses on external events such as the overall macroeconomic conditions, which are likely to affect the borrowers' capacity to repay their loans, while the second group, which looks more at the variability of NPLs across banks, attributes the level of non-performing loans to bank-level factors. Empirical evidence, however, finds support for both sets of factors.

2.1.6.2.1. Loan Growth Rate

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

2.1.6.2.2. Bad Management

Berger and DeYoung (1997), who studied the links between NPLs, cost efficiency and capitalization in the US commercial banks for the period 1985–94, found a two-way causality between cost efficiency to NPLs. While they explained the causality from NPLs to cost efficiency as “bad luck,” driven mainly by deterioration in macroeconomic conditions, they explained this causality from cost efficiency to NPLs through the hypothesis of “bad management.” In particular, this hypothesis argues that low cost efficiency is a signal of poor management practices, thus implying that as a result of poor loan underwriting, monitoring and control, NPLs are likely to increase. Williams (2004) who focused on the relationship between loan quality and cost efficiency among European savings banks from 1990–1998, Podpiera and Weil (2008), who analyzed the Czech banks between 1994–2005, and Louzis, Vouldis and Metaxas (2010), who examined the determinants of NPLs in the Greek banking sector, found support for this hypothesis.

2.1.6.2.3. Adverse Selection and Moral Hazard

The theory of asymmetric information tells us that it may be difficult to distinguish good from bad borrowers (Auronen, 2003), which may result into adverse selection and moral hazards problems. The theory explains that in the market, the party that possesses more information on specific item to be transacted (in this case the borrower) is in a position to negotiate optimal terms for the transaction than the other party (in this case, the lender) (Auronen, 2003). The party that knows less about the same specific item to be transacted is therefore in a position of making either right or wrong decision concerning the transaction. Adverse selection and moral hazards

have led to substantial accumulation of nonperforming assets in banks (Bester, 1994; Bofondi and Gobbi, 2003). The very existence of banks however, is often interpreted in terms of its superior ability to overcome the basic problems of information asymmetry.

The idea underlying this model is that borrowers do not always provide all the information required. Even if they do, not all information will be correct (Changeta, 2007). Borrowers generally have private (internal) information about their projects that is more accurate than the information possessed by lenders. As a consequence, a lender could still be uncertain about the default risk of a loan contract and have difficulties in assessing and controlling the nature and behavior of the borrower. The adverse selection problem occurs if lenders try to protect themselves against default risk by setting their contractual terms in a manner appropriate for the expected average quality of their loan applicants.

The “moral hazard” hypothesis, which was discussed by Keeton and Morris (1987), argues that banks with relatively low capital respond to moral hazard incentives by increasing the riskiness of their loan portfolio, which in turn results in higher non-performing loans on average in the future. Keeton and Morris (1987) indeed showed that excess loss rates were prominent among banks that had relatively low equity-to-assets ratio. The negative link between the capital ratio and NPLs was also found in Berger and DeYoung (1997), and Salas and Saurina (2002). More generally, Keeton and Morris (1987) argued that banks that tend to take more risks, including in the form of excess lending eventually absorbed higher losses. Their finding was supported by Salas and Saurina (2002) and Jimenez and Saurina (2005).

Moral hazard in the banking sector context refers to the adverse incentives created by the prospects of implicit coverage of banks' losses by governments. It can be particularly high when banks' capitalization is low; in such cases, it often leads to adoption of imprudent lending strategies with direct implications for banks' loans portfolios which tend to be heavily skewed toward high risk projects. When these projects are owned by investors and entrepreneurs directly or indirectly connected with the lenders, the financial transaction is termed as insider lending.

2.1.6.2.4. The Principal -Agent problem

The idea underlying this model is that organization decision – taking authority lies in the hands of managers. Shareholders as owners of a company are the principals and managers are their agents. Thus there is a principal –agent relationship between shareholders and managers. In theory managers should act in the best interests of shareholders, that is, their actions and decisions should lead to shareholders wealth maximization. But in practice, managers may not necessarily act in the best interest of shareholders and they may pursue their own personal goals. This problem arises because managers are motivated by self-interest. The root causes of this self –interest is jealousy. Managers work hard to make sure that companies become successful and make huge profit. But due to managers hard work only the shareholders become rich and not managers. Thus, the existence of Principal-Agent type of leadership can contribute to the increase of NPL.

2.1.6.2.5. Risk Premium

The model which is recommended by Ewert, Schenk, (2000), proposes that financial decisions incur different degrees of risk. The “perceived credit risk” depends on a person’s judgment. Risk and expected return move in tandem; the greater the risk, the greater the expected return.

An investor assuming risk from his/her investment requires a risk premium above the risk –free rate. Risk –free rate is a compensation for time and risk premium for risk. The higher the risk of an action, the higher will be the risk of premium leading to higher required return on that action. So according to this theory, the corresponding risk should affect interest rate, that is, the higher the failure risk of the borrower, the higher the interest rate (Ewert, Schenk, Szczeny, 2000).

2.1.6.2.6. Profitability Indicators (ROA and ROE)

Profitability is another important bank-specific determinant of NPLs. Accordingly, profitability measures such as return on assets (net profits to total assets), return on equity (net profits to total shareholders’ equity) or net interest margin (net interest income to total assets) are assumed to be inversely related to the NPL ratio. In this regard, Godlewski (2005) shows that the profitability of a bank has a negative impact on NPLs. Klein (2013) and Louzis et al. (2012) also find NPLs

to be adversely related to profitability. However, García-Marco and Robles-Fernandez (2008) expect that profit maximizing policies will be accompanied with higher levels of risk, which may induce greater NPLs.

2.2. Empirical Literature Review

First of all we focused on the previous literature on the determinants of non-performing loans and specifically on the studies conducted on the non-performing loans of Ethiopian banking sector. We attempted to highlight the determinants of non-performing loans in general and those that can be functional in case of Ethiopia. Non-performing loans are dangerous not only for the economy of one country but also for the whole world as we have seen the financial crisis created by these loans in East Asian countries, America and Sub-Saharan Africa, so this is the need of the era to identify the factors responsible for non-performing loans; as researchers believe that once we identify these factors then we can make policies to prevent any future happenings of these loans (Adebola, Wan Yusoff, & Dahalan, 2011).

According to IMF Working Paper Prepared by Nir Klein (March 2013) on non-performing loans (NPLs) in Central, Eastern and South- Eastern Europe ,the level of NPLs tends to increase when unemployment rises, exchange rate depreciates, and inflation is high. The paper also finds that NPLs are sensitive to bank-level factors. Higher quality of the bank's management, as measured by the previous period's profitability, leads to lower NPLs, while moral hazard incentives, such as low equity, tend to worsen NPLs. In addition, excessive risk taking (measured by loans-to-assets ratio and the growth rate of bank's loans) was found to contribute to higher NPLs in the subsequent periods.

Keeton and Morris (1987) conducted a research in America to identify the factors which are causing non-performing loans in the banking sector, according to them bad performance of agriculture and energy sectors along with poor economic conditions are the main factors causing non-performing loans. Sinkey and Greenwalt (1991) conducted another research in the same country and identify the causes of non-performing loans as high level of interest rate, unnecessary lending along with unpredictable funds are the factors which have positive relationship with the non-performing loans in the banking sector of America.

Ewert, Schenk and Szczesny (2000) studied banks' lending performance in Germany. Their study found evidence that high interest rate, and inadequate collateral had significant positive relationship on the banks poor lending performance.

Das and Ghosh (2007) examined the factors affecting problem loans of Indian state owned banks for the period 1994-2005, considering dependent lagged variable, macro and bank specific variables influencing NPAs. They found that GDP growth rate at macro level and loan growth rate, operating expenses and bank size at bank level play an important role in influencing problem loans.

Thiagarajan et al (2011), carried out a study to predict the determinants of the credit risk in the Indian commercial banking sector by using an econometric model by utilizing a panel data at bank level for 22 public sector banks and 15 private sector banks. They have shown that the lagged non-performing assets had a strong and statistically significant positive influence on the current non-performing assets.

Salas and Saurina (2006) conducted a research in Spain to identify the factors which explains the variation in non-performing loans from 1984-2003 according to the authors high interest rates, GDP growth and soft credit conditions determine the non-performing loans.

Kalirai and Scheicher (2002) found lending rate, production of industry, stock market return and business confidence index are the factors which determine the level of loan quality in Australia while conducting a research taking data from 1990-2001. Bofondi and Ropele (2011) found that non-performing loans are positively associated with the unemployment rates, lending rates and negatively associated with the growth domestic product rate; they conducted their study in Italy by taking the quarterly data over the period of 1990-2010.

Siddiqui, Malik, & Shah (2012) conducted a research in Pakistan covering a period 1996Q to 2011Q3 by applying garch model according to the authors non-performing loans are affected by volatility on interest rates.

Keeton and Morris (1987) argue that banks venturing into excess lending may end up with higher impaired loans.

Sinkey and Greenwalt (1991) assert that banks with greater risk appetite may endure higher NPLs. Salas and Saurina (2002) and Jiménez and Saurina (2006) report higher NPLs for increased bank lending. Klein (2013) also finds positive relation between NPLs and lending.

Berger and DeYoung (1997)²¹ argue that inefficiency leads to higher NPLs due to poor loan underwriting, monitoring and cost control. Williams (2004), Espinoza and Prasad (2010), Podpiera and Weil (2008) and Louzis et al. (2012) also find support for this hypothesis.

Hu et al.(2004) and Ranjan and Dhal (2003) report that larger banks have a better chance to evaluate loans. Salas and Saurina (2002) also find a negative relation between bank size and NPLs and argue that bigger size allows for more diversification opportunities.

Hippolyte Fofack (2005) explores the leading causes of nonperforming loans in Sub-Saharan Africa in the 1990s, using causality and pseudo-panel models. The results show a dramatic increase in nonperforming loans and heightened credit risks which reflect the rapid accumulation of impaired loans, and are largely driven by macroeconomic volatility and terms of trade deterioration. They are particularly high in the agricultural sector and illustrate the extremely high vulnerability of African economies which, in the absence of diversification, remain heavily exposed to macroeconomic and exogenous shocks.

Aballey (2009) studied the causes of bad loans portfolio at African Development Bank. He found evidence that non-performing loans are positively correlated to ineffective monitoring of loans and poor credit appraisal.

Further, Kangimba (2010) studied determinants of non- performing loans in Standard Chartered Bank. He argued that long duration granted for repayment of loans, unwillingness of borrowers to pay back the loan, cheating in declaration of collateral, poor management, lack of business skills, and high competition are the reasons for non-performing loans.

Kwayu (2011) analyzed factors for non- repayment of bank loans at NBC Dodoma region. She argued that interest rate does not affect repayment of loans, but costs incurred during loans application are high. The attitudes of borrowers contributed to non-repayment of loans. Other reasons for poor repayment of loans were bad economic condition and high competition.

During the military rule in Ethiopia, the banking sector was riddled with non-performing loans as a consequence of weak lending practices. For instance, the non-performing loans of the Commercial Bank of Ethiopia amounted to ETB 5.8 billion, equivalent to 59 percent of its total annual loan portfolio at the end of June, 2002. Similarly, the non- performing loans of the Development Bank of Ethiopia reached 94 percent in 2003 (*Banking Sector Review 2010*).

The factors that led these two banks to accumulate massive amounts of non-performing loans and eventually to their insolvency were mismanagement, ineffective supervision and political

interference. All of these factors were at play in Ethiopia during the early years of the current administration (*Admassu Bezabeh, April 2014*)

2.3. Current Situation of Banking Sector in Ethiopia

In 2015/16 the number of banks declined to 18 from 19 due to the merger of Construction & Business Bank with Commercial Bank of Ethiopia. Of the 18 banks 16 were private and 2 public. Banks opened 494 new branches in 2015/16 (of which 363 were private) raising the total branch network to reach 3,187 from 2,693 last year. About 34.4 percent of bank branches were situated in Addis Ababa. The total capital of the banking system rose 39.8 percent to Birr 43.0 billion by end June of 2016 (NBE 2015/16 Annual Report)

Total resources mobilized by the banking system (deposit, loan collection and borrowing) rose by 8.0 percent and reached Birr 149.6 billion by end 2015/16. As commercial banks expanded their branch network, their deposit liabilities increased to Birr 438.1 billion showing a 19.3 percent annual growth. Saving deposits grew by 24.2 percent followed by time deposits (18.6 percent), and demand deposits (13.7 percent). The share of private banks in deposit mobilization increased to 33.6 percent from 32.2 percent last year due to the opening of 363 new branches. Commercial bank of Ethiopia alone mobilized 66.1 percent of the total deposits banking system owing to its large branch network (NBE 2015/16 Annual Report)

Consequently, total outstanding borrowing of the banking system stood at Birr 32.9 billion slightly higher than Birr 31.2 billion a year ago. Of the total borrowing, domestic sources accounted for 89.1 percent and foreign sources the remaining balance of Birr 77.2 billion collected during the review fiscal year was up by 28.6 percent of which, 56.3 percent was the share of private banks (NBE 2015/16 Annual Report)

Banks, including Development Bank of Ethiopia (DBE) disbursed fresh loans to the tune of Birr 88.0 billion in 2015/16 which was a 16.6 percent higher than a year ago. Of the total new loans, about 43.6 percent was made by private banks, and the rest by public banks. About 29.0 percent of the loans went to industry followed by domestic trade (17.1 percent), housing and construction (15.5 percent), agriculture (15.2 percent) and international trade (10.8 percent) and others (12.4 percent) (NBE 2015/16 Annual Report)

Total outstanding credit of the banking system expanded by 20.4 percent and reached Birr 280.3 billion at the end of June 2016. Specifically, outstanding claims on private sector rose by 23.8

percent, on public enterprises 21.2 percent and on the central government 6.2 percent. Outstanding credit to industry accounted trade (18.5 percent), domestic trade (10.2 percent), housing and construction (10 percent) and agriculture (7.3 percent). The share of private sector (including cooperatives) in outstanding credit was Birr 179.2 billion (or 63.9percent) depicting a 21.5 percent annual growth (NBE 2015/16 Annual Report)

2.4.Research Hypotheses

A hypothesis is a specific and testable statement of prediction about what you expect to happen between variables in your study. It is a tentative statement about the relationship between two or more variables (Kendra Cherry (2016). This research study is sought to explain the significance of growth in GDP, inflation rate, exchange rate, real interest rate, ROA, ROE, and loan growth rate on the level of Non-Performing Loans in commercial banks in Ethiopia hence it is a cause-effect investigation.

Therefore, the researcher formulated the following hypothesis:

H1: ROA has negative relationship with NPLs in commercial banks in Ethiopia.

H2: ROE has negative relationship with NPLs in commercial banks in Ethiopia.

H3: GDP growth has negative relationship with NPLs in commercial banks in Ethiopia

H4: Inflation has considerable relationship with NPLs in commercial banks in Ethiopia.

H5: Loan growth rate has positive relationship with NPLs in commercial banks in Ethiopia.

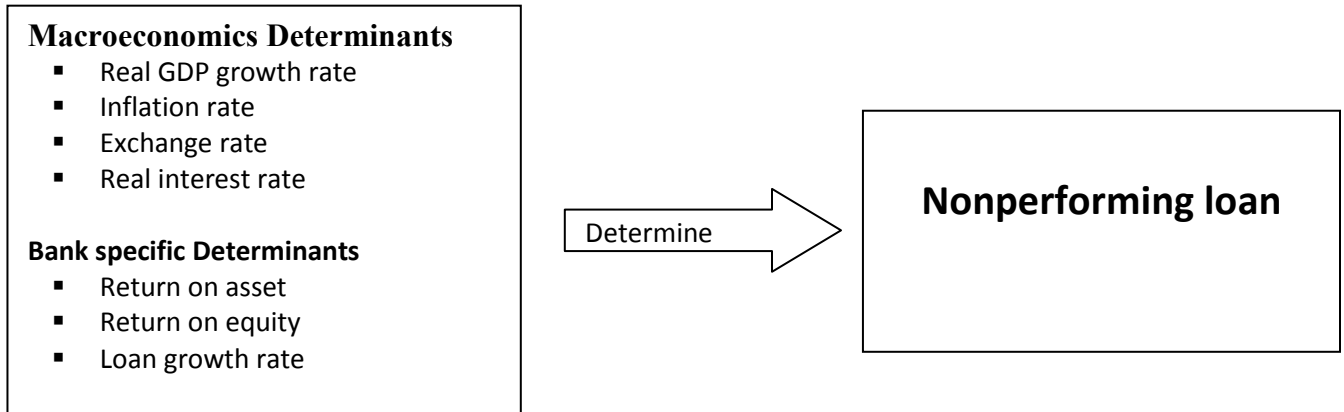
H6: Exchange rate has considerable relationship with NPLs in commercial banks in Ethiopia.

H7: Real Interest rate has positive relationship with NPLs in commercial banks in Ethiopia.

2.5.Conceptual Frame Work

The aim of this study is to identify the determinants of nonperforming loan in commercial banks in Ethiopia which can be divided in to bank specific and macroeconomics determinant. Accordingly, based on the objective of the study, the following conceptual model has been framed. Nonperforming loans are affected by macroeconomics factor and banks specific factors. The macroeconomics factors included real GDP growth, inflation rate, exchange rate and real interest rate. Loan growth rate, ROA and ROE are bank specific factors determine the NPL.

Figure: 2.1: Conceptual framework of dependent and independent variables



Source: Researcher own formulation.

CHAPTER THREE: METHODOLOGY OF THE STUDY AND MODEL SPECIFICATION

This chapter presented in two parts. The first part presented the research design, sample design, target population, data collection methods, data analysis, Research validity, reliability and ethical issues. Whereas the second part of the chapter is about econometric regression model specification.

3.1. Methodology of the Study

Research is an academic activity and as such the term should be used in a technical sense. This paper is based on secondary data, information from commercial banks annual report and NBE, IFM and from different papers or reports. These data are very important because they had helped us to see the effect of macroeconomic and bank specific variables on non-performing loans.

To understand the reasons of the ongoing growth of the nonperforming loans, this paper will be use a regression model. The model will be taken into consideration some macroeconomic and bank specific factors that have contributed to the nonperforming loans level and is used regression analysis using Eviews8 software program, and analyzed data of commercial banks from 2007 to 2016. In order to better understand the relationship exists between these variables, the researcher used a simple regression model.

3.1.1. Research Design

Research design is the blueprint for fulfilling research objectives and answering research questions. In other words, it is a master plan specifying the methods and procedures for collecting and analyzing the needed information.

The study used an explanatory (causal) research design. Explanatory research is conducted in order to identify the extent and nature of cause-effect relationships between dependent and independent variables. This design is defined by Thornhill (2000) as a study which seeks to establish causal relationship between variables with main emphasis being to study a problem in order to explain the relationship between variables. It aims at explaining how one variable produces changes in the other. This study sought to explain the significance of interest rate,

growth in GDP, inflation rate, exchange rate, real interest rate, ROA, ROE and loan growth rate on NPLs in commercial banks in Ethiopia.

At the end, the researcher established whether the independent variables determine the NPL and make conclusions based on the relationship established.

3.1.2. Data

The analysis uses panel data of individual banks' balance sheets from Bank scope as well as macroeconomic indicators from NBE data base. Data is based on annual frequency for 2007 - 2016, and covers the eight oldest private commercial banks in Ethiopia.

While many variables were considered in the estimation process, the baseline specification includes three explanatory bank-level variables return on asset, return on equity (*ROE*), and the Loans growth rate; three country specific variables (inflation, the change in exchange rate GDP growth. It is worth mentioning that Bank scope reports the level of ~~impaired loans~~, which may be different than the official classification of non-performing loans.

Impaired loans is an accounting concept, which reflects cases in which it is probable that the creditor will not be able to collect the full amount that it is specified in the loan agreement, while ~~NPL~~ is a regulatory concept, which primarily reflects loans that are more than 90 days past due. Acknowledging these differences, we treated ~~impaired loans~~ as NPLs in this analysis.

3.1.3. Population

Any research work has conclusion inferred from set of premises. The conclusion could be about groups of people, groups of organizations, employees in an organization, contracts between organizations, about economic phenomenon, and the like. The broad class of people, objects, or events that are targeted by the conclusion is known as population or universe

In this study, the population consisted of commercial banks in Ethiopia licensed by the National Bank of Ethiopia. By 2016, there are 17 commercial banks-one government owned and 16 privates (NBE 2015/16 Annual Report). The target population was all the commercial banks and observation unit from which data will be collected.

3.1.4. Sampling Technique

Sample is the portion of the study population and used when addressing the total population in the study is not possible. Different authors show that the need for considering different factors in deciding on the desired sample size. These factors include the availability of time and resources, homogeneity of the target population, the accuracy required and the aim of the research (Sarantakos 2005, cited in Wollela, 2008).

The secondary data were collected from 10 years data of purposively selected target population out of all commercial banks registered by the National Bank of Ethiopia. Accordingly, from 17 commercial banks in Ethiopia (NBE 2015/16 Annual Report), the researcher purposively selected 8 commercial banks i.e. Awash Bank, Dashen Bank, Bank of Abyssinia, Wegagen Bank, United Bank, NIB Bank, CBO and Lion International Bank.

3.1.5. Sample Size

Since the study is based on 10 years secondary data of the selected target population out of all commercial banks registered by the National Bank of Ethiopia (NBE 2015/16), limiting time period based on their year of establishment and data availability is mandatory. Hence the selected banks should be in operation on or before the fiscal year 2007. Accordingly, from 17 commercial banks registered in the country as of June 2005/16, the researcher has selected purposively 8 commercial banks from which 10 years of secondary data were collected for the research analysis.

3.1.6. Data Collection Methods

The dependent variable is Commercial bank's Non-Performing Loans which is measured in quantitative terms. Data of the independent variables GDP, Inflation, exchange rate, Real interest rate, ROA, ROE, Loan growth rate were collected from the sample commercial banks, NBEs data base and Ministry of economic and finance annual reports. It is always a regulatory requirement for commercial banks to report their Non-Performing Loans data to the Central Bank of Ethiopia periodically as part of the returns. Therefore, data about the dependent and independent variables were collected from bank's own annual reports, Magazines, internet web

sites and the NBE using secondary data collection form. The secondary data are the macro information and, loan growth rate, ratio of non-performing loans, ROA, and ROE are the bank specific data.

3.1.7. Data Analysis

To achieve the objective of the study, Data collected using documents, were analyzed quantitatively. The secondary data collected was coded, tabulated, presented and analyzed using econometrics regression analysis method by using Eviews8 software package. The hypothesis tests regarding the coefficient estimates are validly conducted and assumptions relating to the classical linear regression model were tested as required relating to the study. Descriptive statistics, mean, standard deviation, minimum and maximum values were analyze from the regression results.

3.2. Ethical Issues

Virtually all studies with human participants involve some degree of risk. These risks may range from minor discomfort to much more severe effects on participants' physical or emotional or social well-being. Thus, the researcher conduct the study based on the Nuremberg Code of research ethics.

Due consideration was given to obtain consent from each participant about their participation in the study. It was strictly conducted on voluntary basis. The researcher tried to respect participants' right and privacy. The findings of the research were presented without any deviation from the outcome of the research. In addition, the researcher gave full acknowledgements to all the reference materials used in the study.

3.3. Model Specification

To implement econometric model for this study, the researcher used both macro-economic and financial or bank specific variables.

Macroeconomic data are collected from NBE annual reports, and for specific banks data, the researcher used bank's annual financial report. In this study, non-performing loans is explained by four macroeconomic variables and three variables specific to the banks.

$$\text{NPL}_{i,t} = \beta_0 + \beta_1 \Delta \text{GDP}_{t-1} + \beta_2 \text{INF}_t + \beta_3 \text{XR}_t + \beta_4 \text{RIR}_t + \beta_5 \text{ROA}_{i,t} + \beta_6 \text{ROE}_{i,t} + \beta_7 \text{LG}_{i,t} + \varepsilon_{i,t}$$

TL Where,

NPL/TL $_{i,t}$: is the ratio of non-performing loans to total loans for bank i in year t .

ΔGDP_{t-1} : is the annual growth in real GDP at period $t-1$.

INF t : is the annual rate of inflation at period t .

RIR t : is the average annual Real interest rate at year t .

XR t : is the annual exchange rate at year t .

RIR t : is the real interest rate at year t .

ROE $_{i,t}$: is the ratio of Net income from operation to Average equity for bank i at year t .

ROA $_{i,t}$: is the ratio of Net income from operation to Average asset for bank i at year t .

LG $_{i,t}$: is represents loan growth rate for the bank i in year t .

$\varepsilon_{i,t}$: error term of bank i at period t .

3.4. Variables of the Study

For the analyses purpose, nonperforming loan treated as the dependant variable; NPL rate calculated by using the ratio of impaired loan to total loan, where as Loan growth rate, return on asset and return on equity treated as independent variable from bank specific factors and GDP, exchange rate, Real interest rate and inflation as independent variables of determinants of NPL from macroeconomic factors.

Table: 3.1 Summary of variables, their definition and expected sign.

Name of variable	Type the variables	Definition of the variables	expected sign
NPL	Dependent	the ratio of non-performing loans to total loans	
GDP growth rate	Independent	annual growth rate in real GDP of Ethiopia	-
Inflation rate	Independent	the annual rate of inflation of Ethiopia	-/+
Exchange rate	Independent	the annual exchange rate b/n birr and USD	-/+
Loan growth rates	Independent	represents loan growth rate of bank	+
Real interest rate	Independent	the average annual Real interest rate	+
ROE	Independent	ratio of Net income from operation to Average equity of bank	-
ROA	Independent	the ratio of Net income from operation to Average Asset of bank	-

CHAPTER FOUR: RESULTS PRESENTATION AND DISCUSSIONS

This chapter captures the presentation, analysis and discussions of the result of the research work. The objective of the study is to identify the determinants of NPLs in commercial banks in Ethiopia. The chapter presents the results and findings of the study which was to establish the determinants of non-performing loans in commercial banks in Ethiopia. The analysis is based on data of eight commercial banks collected from 2007 to 2016. The data for this study was obtained from National Bank of Ethiopia and private banks own audited annual reports. The data was analyzed using descriptive analysis, correlation analysis and simple linear regressions analysis to answer the research question and fulfill objective by using Eviews8 software output. The results are presented in the form of summary tables.

4.1. The Statistical Results of Secondary Data

4.1.1. Descriptive Statistic Analysis

The descriptive statistics for dependent and independent variables are presented and their results are discussed in the table 4.1 bellow. For both dependent and independent variables value of minimum, maximum, mean and standard deviation are presented. Nonperforming loan is treated as the dependant variable which is calculated by using the ratio of impaired loan to total loan, where as loan growth rate, return on asset and return on equity treated as independent variable from bank specific factors and GDP growth rate, exchange rate, Real interest rate and inflation as independent variables of determinants of NPL from macroeconomic factors

The mean of NPL of the eight banks under the study was 4.58 percent and the standard deviation was 1.6 percent. The mean of the NPL was almost equal to the minimum value of the NPL ratio requirement of national Bank of Ethiopia (5%). The standard deviation of 1.6% indicated that NPLs of commercial banks are far from the mean value of 4.58 on average by 1.6%. But when the NPL ratio of each banks are compared, there is great variation between them. i.e., it is ranging from 1.3 percent to 9.1 percent.

From the macro determinants of NPLs, GDP growth rate has a mean value 10.24 percent and the minimum value was 8 percent per year to maximum of 11.79 percent. The result was indicated

that the economic growth of the country was above 10 percent per year for the study period between 2007 and 2016. This may categorized the country under the fastest economic growth rate category.

Exchange rate has a mean value of 15.33 percent, minimum value 8.79 percent and maximum value of 21.17 percent. This result tells us that the depreciation of Ethiopian birr against USD dollar was very high during the period between 2007 and 2016. I.e. the USD dollar against birr was appreciated from birr 8 in 2007 to birr 21.17 in 2016 which is about 165% inflated.

The real interest rate, which is the difference between average lending interest rate and inflation rate, has mean value of 3.26 percent, minimum value of 1.43 percent and the maximum value was 5.22 percent. Since the inflation rate of the country has a mean value of 17.15 percent, the lending interest rate in the commercial banks, on average, was above mean inflation rate.

From the banks specific determinant variables of NPL, ROE has mean value of 39 percent, minimum value 13.5 percent and maximum value of 86.9 %. The standard deviation of 13% implies that the ROE in commercial banks during the period between 2007 and 2016 was very fluctuating.

ROA was at small percentage as per compared with the ROE. The mean value of the ROA was 4.43 percent, the minimum value 0.35% and the maximum value was 8.17%. The standard deviation of 1.36 percent showed that ROA during the period was almost constant as per compared with the standard deviation of ROE which is 13.06%.

Loan growth rate of the commercial banks has a mean value of 22.61 percent. This showed that the loan of commercial banks has been grown, on average, at 22.61 percent per year.

Table: 4.1 Descriptive statistics result

	NPL	RIR	XRATE	INF	ROE	GDP	LOAN	ROA
Mean	4.579	3.259	15.325	17.152	39.008	10.235	22.607	4.427
Median	4.330	3.245	16.686	14.660	37.688	10.375	19.786	4.375
Maximum	9.010	5.220	21.171	36.400	86.930	11.790	61.291	8.167
Minimum	1.351	1.430	8.794	2.800	13.483	8.000	1.862	0.335
Std. Dev.	1.595	0.979	4.423	10.898	13.069	1.118	12.948	1.361
Skewness	0.292	0.232	- 0.287	0.593	0.784	- 0.625	0.808	0.076
Kurtosis	2.503	3.138	1.545	2.068	4.083	2.565	3.358	4.387
Jarque-Bera	1.962	0.780	8.153	7.583	12.104	5.843	9.140	6.494
Probability	0.375	0.677	0.017	0.023	0.002	0.054	0.010	0.039
Sum	366.329	260.712	1,226.038	1,372.160	3,120.632	818.800	1,808.538	354.162
Sum Sq. Dev.	200.937	75.700	1,545.354	9,383.291	13,492.709	98.703	13,243.597	146.266
Observations	80	80	80	80	80	80	80	80

Source: Eview8 computation using data from NBE

4.1.2. Results of Regression Analysis

Regression analysis is a statistical process for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables. More specifically, regression analysis helps one understand how the typical value of the dependent variable changes when any one of the independent variables is varied, while the other independent variables are held fixed. Most commonly, regression analysis estimates the

conditional expectation of the dependent variable given the independent variables – that is, the average value of the dependent variable when the independent variables are fixed.

In chapter three the researcher specified the regression model as:

$$NPL_{i,t} = \beta_0 + \beta_1 \Delta GDP_{t-1} + \beta_2 INF_t + \beta_3 XR_t + \beta_4 RIR_t + \beta_5 ROA_{i,t} + \beta_6 ROE_{i,t} + \beta_7 LG_{i,t} + \varepsilon_{i,t}$$

TL Where,

$NPL/TL_{i,t}$: is the ratio of non-performing loans to total loans for bank i in year t.

GDP_{t-1} : is the annual growth rate in real GDP at period t-1.

INF_t : is the annual rate of inflation at period t.

RIR_t : is the average annual Real interest rate at year t.

XR_t : is the annual exchange rate at year t.

RIR_t : is the real interest rate at year t.

$ROE_{i,t}$: is the ratio of Net income from operation to Average equity for bank i at year t.

$ROA_{i,t}$: is the ratio of Net income from operation to Average asset for bank i at year t.

$LG_{i,t}$: is represents loan growth rate for the bank i in year t. $\varepsilon_{i,t}$: error term of bank I at period t.

Table 4.2: Regression Result

Dependent Variable: NPL

Method: Panel Least Squares

Date: 05/25/17 Time: 00:53

Sample: 2007 2016

Periods included: 10

Cross-sections included: 8

Total panel (balanced) observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.49840	2.926430	5.296010	0.0000***
RIR	0.432867	0.138048	3.135624	0.0025***
XRATE	-0.287755	0.042470	-6.775510	0.0000***
INF	-0.014636	0.013933	-1.050436	0.2970
ROE	-0.015064	0.008011	-1.880476	0.0641**
GDP	-0.097370	0.175598	-0.554506	0.5810
LOAN	-0.052155	0.007104	-7.341715	0.0000***
ROA	-0.470821	0.076005	-6.194572	0.0000***

R-squared	0.781690	Mean dependent var	4.579111
Adjusted R-squared	0.760466	S.D. dependent var	1.594836
S.E. of regression	0.780548	Akaike info criterion	2.436999
Sum squared resid	43.86639	Schwarz criterion	2.675201
Log likelihood	-89.47995	Hannan-Quinn criter.	2.532501
F-statistic	36.82956	Durbin-Watson stat	2.040723
Prob(F-statistic)	0.000000		

Source: Own Eviews8 computation using data from NBE

*** Significant at 1% level of confidence

** Significant at 10% level of confidence

The above Table 4.2 presented econometric regression result of nonperforming loan as dependent variable and four macroeconomic and three bank specific independent variables from sample of eight commercial banks in Ethiopia. The results presented in Table 4.2 broadly confirm that both bank-level and macroeconomic factors play a role in affecting the banks' asset quality, although the contribution of macroeconomic factors is relatively low.

Using the result above, we can rewrite the model by including the coefficients of the result as follows:

$$NPL = 15.498 - 288XRATE - 0.015INF - 0.015ROE + 0.433RIR - 0.097GDP - 0.052LG - 0.471ROA + \hat{U}_t$$

❖ Goodness of fit (R^2) and adjusted (R^2)

R^2 is a number that indicates the proportion of the variance in the dependent variable that is predictable from the independent variable. R^2 is a statistic that will give some information about the goodness of fit of a model. In regression, the R^2 coefficient of determination is a statistical measure of how well the regression line approximates the real data points. An R^2 of 1 indicates that the regression line perfectly fits the data. It provides a measure of how well observed outcomes are replicated by the model, based on the proportion of total variation of outcomes explained by the model.

Important cases where the computational definition of R^2 can yield negative values, depending on the definition used, arise where the predictions that are being compared to the corresponding

outcomes have not been derived from a model-fitting procedure using those data, and where linear regression is conducted without including an intercept. Additionally, negative values of R^2 may occur when fitting non-linear functions to data. In cases where negative values arise, the mean of the data provides a better fit to the outcomes than do the fitted function values, according to this particular criterion. Values of R^2 outside the range 0 to 1 can occur where it is used to measure the agreement between observed and modeled values and where the "modeled" values are not obtained by linear regression.

$R^2=0.78$ From the regression result above, the R^2 of 0.78 suggested that the explanatory variable GDP growth rate, inflation rate, exchange rate, real interest rate, ROA, ROE and loan growth rate of commercial banks together explained about 78% change or variation in the dependent variable or nonperforming loans. Thus, 78% of changes in nonperforming loans of commercial banks are due to change in the explanatory variables identified by the researcher.

Adjusted R^2 of 0.76 The explanation of this statistic is almost the same as R^2 but it penalizes the statistic as extra variables are included in the model. It showed that the overall fitness of the model as one extra variable is included in the model. Thus, the value of 0.76 indicated the goodness of the model. 76% of the change in NPLs in commercial banks in Ethiopia is due to change in the above macroeconomic and bank specific variables.

$$NPL = 15.498 - 288XRATE - 0.015INF - 0.015ROE + 0.433RIR - 0.097GDP - 0.052LG - 0.471ROA + \hat{U}_t$$

The F-statistic from the model result showed that the model is significant even at 1% level of confidence. It is not misspecification error. Since the model is significant, the coefficients and standard deviations of the above model have no errors. The estimated coefficients are the best estimators of the real or the true coefficient of the variable determining the NPLs. The model and specification of the variables are statistically correct.

Durbin-Watson statistic (2.04) The Durbin-Watson statistic is a test statistic used to detect the presence of autocorrelation (a relationship between values separated from each other by a give time lag) in the residuals (prediction errors) from a regression analysis. Since the result is near to 2, the null hypothesis that the error terms are serially uncorrelated against the alternative that they follow a first order autoregressive process should not be rejected. I.e. there is no indication of serially autocorrelation in the error terms.

Discussion of relationship between dependent and independent variables in the study

Under this section, the relationship between dependent variable and all independent variables and the overall results of the study were discussed in detail based on the above regression result.

4.1.2.1. Nonperforming Loan and Return on Equity (ROE)

Using a panel of 129 banks applied in Spain for the period 1993-2000, Garcíya-Marco and Robles-Fernandez (2008) indicate that high levels of return on equity (ROE) are followed by a greater future risk. They argue that the policy of profit maximization is accompanied by high levels of risk.

In the studies conducted by Louzis (2012) and Lobna Abid and et al., (2013), researchers express their expectation of a negative correlation for variable ROE and loan defaults.

Starting with the bank-level indicators, higher profitability (ROE) contributes to lower NPLs and suggests that better managed banks have, on average, better quality of assets (corroborating the “bad management” hypothesis).

The result of the study (Table 4.2) indicated that there is negative relationship between ROE and nonperforming loan in commercial banks in Ethiopia. The coefficient is -0.015. This implied that there is negative relationship between nonperforming loan and ROE which is significant. The interpretation of the coefficient is that other thing remain constant, an increase of ROE of a commercial bank in Ethiopia by one birr will result in a decline of 0.015 birr in nonperforming loan of commercial banks in Ethiopia which is statistically significant at 10% level of confidence. Therefore, the researcher should not reject the hypothesis that say there is a negative relationship between ROE and NPLs in commercial bank. The result also confirms the theory and the empirical studies conducted by Louzis (2012) and Lobna Abid and et al., (2013).

4.1.2.2. Nonperforming Loans and Return on Asset (ROA)

Godlewski (2004) used return on assets (ROA) as a performance indicator. He shows that the impact of banks' profitability is negative on the level of NPL ratio.

The coefficient of ROA from the regression result above (Table 4.2) is -0.47 indicated that the result is supported by the literature and empirical evidence stated above. ROA has a negative relationship with non performing loan in commercial banks in Ethiopia. The interpretation of the result is that other thing remain constant an increase in ROA by one birr in commercial banks will decline non performing loans of commercial banks by 0.47 birr which is statistically significant at 1% level of confidence. The p-value of 0.000 has justified the significance of the relationship. Therefore, the null hypothesis that ROA and nonperforming loan has negative relationship should be accepted.

4.1.2.3. Nonperforming Loans and Loan Growth Rate

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

Credit growth rate is deemed as one of the variables which affects and soon warns credit risk in banks' business. Fisher (1933) and Keynes (1934), in their financial accelerator mechanism, pointed out that during the period of rapid credit growth, capital flows which are constantly poured into the economy will result in the continuous increase in property value, the better criteria and benefits of economic agents. This causes the easy issue of credits with higher degree of credit risk. At the same time, rapid credit growth often occurs in the period of fierce competition among commercial banks, causing the reduction in credit standards and the increase in credit risk in the future (Dell Ariccia and *et al.*, 2009; Salas and Saurina, 2002; Jimenez and Saurina, 2007). Simultaneously, Berger *et al.*, (2004) also claim that fast credit growth will

influence commercial banks' management of risk and client information, thereby causing the increase in credit risk.

Referring to the regression result above (Table 4.2), loan growth rate in commercial banks in Ethiopia has showed negative relationship (-0.052) with nonperforming loan and statistically significant. The interpretation is that all other explanatory variables kept constant, an increase in loan growth rate by one birr will resulted in a decline in NPLs of commercial banks in Ethiopia which is statistically significant at 1 percent level of confidence. But as the existing empirical evidence from different countries, the loan growth rate and non performing loan has positive relationship. Thus, the researcher failed to accept, the null-hypothesis that loan growth rate and non performing loan has positive relationship. The coefficient is also very small indicating that change in loan growth has very small effect on change in nonperforming loan in commercial banks in Ethiopia.

4.1.2.4. Nonperforming Loans and GDP Growth Rate

Basel (2013) using estimation technique method and panel data set Covering 75 countries over ten year period from 2005 to 2010 studied the macroeconomic determinants of non-performing loans. The Analysis presented that real GDP growth was the main driver of non- performing loan ratio.

There is a significant empirical evidence of negative association between growth in gross domestic product and non-performing loans (Louzis, Vouldis and Metaxas 2011, Khemraj and Pasha (2009), Salas and Suarina, 2002; Rajan & Dhal, 2003; Fofack, 2005; and Jimenez and Saurina, 2005). If we look into the explanation of this negative relationship provided by the literature we find that growth in the gross domestic product usually increases the income which ultimately enhances the loan payment capacity of the borrower which in turn contributes to lower bad loan and vice versa (Khemraj and Pasha, 2009).

Kiayai (2003) argue that the poor fiscal policy had resulted to high inflation rates and that this could be one of the contributors of NPLs.

Keeton and Morris (1987) conducted a research in America to identify the factors which are causing non-performing loans in the banking sector, according to them bad performance of

agriculture and energy sectors along with poor economic conditions are the main factors causing non-performing loans.

Das and Ghosh (2007) examined the factors affecting problem loans of Indian state owned banks for the period 1994-2005, considering dependent lagged variable, macro and bank specific variables influencing NPAs. They found that GDP growth rate at macro level and loan growth rate, operating expenses and bank size at bank level play an important role in influencing problem loans.

From the regression result, the relationship between GDP growth rate and nonperforming loan in Ethiopian commercial banks are negative. The empirical studies and existing literature also indicated that GDP growth and non performing loan has a negative relationship. The interpretation of the coefficient (-0.097) is that other independents variables of the study kept constant, an increase in GDP growth rate by 1 percent will result in 0.097 percent decline in NPLs in commercial banks in Ethiopia. However, the p-value of the GDP growth is 0.5810 which is statistically insignificant. Thus, as per the hypothesis developed previous for the study, there is a negative relationship, but very insignificant. The coefficient's p-value (0.58) was showed that the variable has very insignificant effect on the change in nonperforming loans in commercial banks in Ethiopia

4.1.2.5. Nonperforming Loans and Inflation Rate

There is an empirical evidence of positive relationship between the inflation in the economy and non-performing loans (Khemraj and Pasha, 2009, Fofack 2005). While Nkusu, (2011) has explained that this relationship can be positive or negative according to the author inflation affects loan payment capacity of borrowers positively or negatively, higher inflation can enhance the loan payment capacity of borrower by reducing the real value of outstanding debt; moreover increased inflation can also weaken the loan payment capacity of the borrowers by reducing the real income when salaries/wages are sticky, moreover by highlighting the role of inflation in the presence of variable interest rate. Nkusu further explains that in this scenario inflation reduces the debt servicing capacity of the loan holders as lenders adjust the lending interest rates to adjust their real return. So according to literature relationship between inflation and non-performing loans can be positive or negative depending on the economy of operations.

According to the study result (Table 4.2), the macroeconomic variable, inflation, has a negative relationship with nonperforming loan in commercial banks in Ethiopia. The result was supported by related existing literature and empirical evidence discussed above. The null hypothesis that inflation has a considerable relationship with non performing loan is accepted. But, as per p-value of 0.297, it is insignificant even at 10%. The interpretation of the result is that other thing remain constant, an increase in inflation by 1% will result in 0.297% decline in nonperforming loan in commercial banks in Ethiopia which is statistically insignificant. Thus, from the macro determinants, inflation growth rate has relationship with NPLs but statistically not confirmed.

4.1.2.6. Nonperforming Loans and Real Interest Rate

Real interest rate shows prices of loans and real costs which are incurred by economic agents. For this reason, the change of real interest rate will influence individuals' and enterprises' debt payment to commercial banks. Also, together with decline in GDP growth, high unemployment rate, the increase in real interest rate and high inflation rate is considered an alert for banking crisis Demirguc (1998). The previous experimental studies also find the existence of strong correlations between real interest rate and credit risk at commercial banks such studies conducted by Bofondi and Ropele (2011) or Berge and Boye (2007) and Louzis (2010). A win-win correlation between real interest rate (Realirt) and credit risk (NPLs) is expected by the author.

From the regression result (Table 4.2), real interest rate and nonperforming loan has positive relationship which is statistically significant at 1% level of confidence. The coefficient 0.433 interpreted as other thing remain constant, an increase in real interest rate by one percent will result in increase of 0.433 percent increase in nonperforming loan of commercial banks in Ethiopia which is statistically significant at 1% level of confidence. Thus, the researcher accepts the null hypothesis, that real interest rate and non performing loan has a considerable relationship.

4.1.2.7. Nonperforming Loans and Exchange Rate

As far as relationship of the exchange rate is concerned literature provides mixed reviews. According to Khemraj and Pasha (2009) there is a positive relationship between real effective exchange rate and non-performing loans. An appreciation in exchange rates may have different implications i.e. it can adversely affect the loan payment capacity of export oriented firms (Fofack, 2005) on the other hand it can positively affect the loan payment capacity of those

borrowers who borrow in foreign currency, the relationship between nominal effective exchange rate (includes inflation) and non-performing loans is indeterminate.

The research result (Table 4.2) has indicated that there is negative relationship between exchange rate of birr for dollar and nonperforming loan. The empirical and existing literature reviews have supported the result. The coefficient of -0.2877 interpreted as keeping other explanatory variable constant, an increase of 1% in exchange rate will result in a decline in 0.2877% in nonperforming loans in commercial banks in Ethiopia which is statistically significant at 1% level of confidence. Thus, the null hypothesis that there is negative relationship between exchange rate and non performing loan in commercial banks in Ethiopia should be accepted.

4.1.3. Tests for Assumptions

There are five classical assumptions were made relating to the classical linear regression model (CLRM). These were required to show that the estimation technique, ordinary least squares (OLS), had a number of desirable properties, and also so that hypothesis tests regarding the coefficient estimates could validly be conducted (Brooks ,2008). If these assumptions are violated but this fact is ignored and the researcher proceeds, the coefficient estimates are wrong, the associated standard errors are wrong, and the assumed distributions are wrong. Specifically, it was assumed that:

- (a) $E(u_t) = 0$
- (b) $\text{var}(u_t) = \sigma^2 < \infty$
- (c) $\text{cov}(u_i, u_j) = 0$
- (d) $\text{cov}(u_t, x_t) = 0$
- (e) $u_t \sim N(0, \sigma^2)$

4.1.3.1. Test for the Average Value of The Error Term is Zero

The first assumption required is that the average value of the errors is zero. In fact, if a constant term is included in the regression equation, this assumption will never be violated. If the regression did not include an intercept, and the average value of the errors was nonzero, several undesirable consequences could arise. First, R^2 , defined as ESS/TSS can be negative, implying that the sample average, $\bar{y}$, 'explains' more of the variation in y than the explanatory variables.

Second, and more fundamentally, a regression with no intercept parameter could lead to potentially severe biases in the slope coefficient estimates (Brooks 2008).

From the regression result we can see that constant term was included the regression equation. (15.49). Thus, the research study result has fulfilled the assumption that the average value of the error term is zero because the constant term 15.49 is included in the regression equation. The researcher concluded that there is no problem of biases in the slope of coefficient estimates and therefore, it justified the correctness of the coefficients.

4.1.3.2. Test For Homoscedasticity

It has been assumed that the variance of the errors is constant, σ^2 -- this is known as the assumption of homoscedasticity. If the errors do not have a constant variance, they are said to be heteroscedastic. If the errors are heteroscedastic, but this fact is ignored and the researcher proceeds with estimation and inference, OLS estimators will still give unbiased (and also consistent) coefficient estimates, but they are no longer BLUE -- that is, they no longer have the minimum variance among the class of unbiased estimators (Brooks 2008). The reason is that the error variance, σ^2 , plays no part in the proof that the OLS estimator is consistent and unbiased, but σ^2 does appear in the formulae for the coefficient variances. If the errors are heteroscedastic, the formulae presented for the coefficient standard errors no longer hold.

Table :4.3 test result for existence of heteroskedasticity

Heteroskedasticity Test: White

F-statistic	0.790192	Prob. F(7,72)	0.5978
Obs*R-squared	5.707466	Prob. Chi-Square(7)	0.5743
Scaled explained SS	2.109308	Prob. Chi-Square(7)	0.9535

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 05/25/17 Time: 08:18

Sample: 1 80

Included observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.160030	1.367247	0.848442	0.3990

RIR^2	0.005680	0.015577	0.364624	0.7165
XRATE^2	-0.000250	0.001197	-0.209040	0.8350
INF^2	4.33E-06	0.000292	0.014855	0.9882
ROE^2	-3.00E-05	5.94E-05	-0.504355	0.6156
GDP^2	-0.004737	0.007736	-0.612293	0.5423
LOAN^2	-1.84E-05	8.18E-05	-0.224396	0.8231
ROA^2	-0.002356	0.005477	-0.430230	0.6683
R-squared	0.071343	Mean dependent var	0.548330	
Adjusted R-squared	-0.018943	S.D. dependent var	0.527101	
S.E. of regression	0.532070	Akaike info criterion	1.670557	
Sum squared resid	20.38312	Schwarz criterion	1.908760	
Log likelihood	-58.82230	Hannan-Quinn criter.	1.766060	
F-statistic	0.790192	Durbin-Watson stat	2.155970	
Prob(F-statistic)	0.597833			

Source: own computation from secondary data from banks annual report using Eview8

In this case, both the F- and χ^2 (LM) versions of the test statistic give the same conclusion that there is no evidence for the presence of heteroscedasticity, since the p-values are considerably in excess of 0.05. The third version of the test statistic, *_Scaled explained SS'*, which as the name suggests is based on a normalized version of the explained sum squares from the auxiliary regression also indicated there is no evidence of heteroscedasticity. Thus, the researcher concluded that the variance of the errors term is constant or homoscedasticity.

Therefore, the null hypothesis that there is heteroscedasticity in the error term should be rejected.

4.1.3.3. Test for the Absence of Autocorrelation

According to this classical linear regression model assumption, the covariance between the error terms over time (or cross-sectionally, for that type of data) is zero. In other words, it is assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are *_autocorrelate'* or that they are serially correlated.

To check for the existence of the autocorrelation between the error terms, one method is by referring to DW result from the regression output, we can check for that the absence or the existence of auto-correlation in the model.

From the regression result, the Durbin-Watson (DW) is 2.04 means it approached to 2 indicating there is no evidence for the presence of autocorrelation.

But, if the test were used in the presence of lags of the dependent variable or otherwise stochastic repressors, the test statistic would be biased towards 2, suggesting that in some instances the null hypothesis of no autocorrelation would not be rejected when it should be.

Therefore, DW is a test of only whether consecutive errors are related to one another or not. So, not only the DW test cannot be applied, if a certain set of circumstances are not fulfilled, there will also be many forms of residual autocorrelation that DW cannot detect. For example if $\text{corr}(\hat{u}_t, u_{t-1}) = 0$, but $\text{corr}(\hat{u}_t, u_{t-2}) \neq 0$, DW as defined above will not find any autocorrelation. Thus, we can go to the second well known method for test for the existence of autocorrelation.

Therefore, it is desirable to examine a joint test for autocorrelation that will allow examination of the relationship between $\hat{u}_t$ and several of its lagged values at the same time. **Table: 4.4 Test for the existence serial correlation between the error terms**

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.001349	Prob. F(2,70)	0.9987
Obs*R-squared	0.003083	Prob. Chi-Square(2)	0.9985

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 05/25/17 Time: 08:16

Sample: 1 80

Included observations: 80

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.038762	3.060913	0.012663	0.9899
RIR	-0.001721	0.143954	-0.011955	0.9905
XRATE	-0.000527	0.044282	-0.011907	0.9905
INF	-0.000152	0.014457	-0.010481	0.9917
ROE	-4.27E-05	0.008174	-0.005220	0.9959
GDP	-0.001781	0.181399	-0.009818	0.9922
LOAN	-0.000141	0.007711	-0.018227	0.9855
ROA	0.000160	0.077144	0.002077	0.9983
RESID(-1)	-0.000507	0.122172	-0.004149	0.9967
RESID(-2)	0.006815	0.131963	0.051643	0.9590
R-squared	0.000039	Mean dependent var	5.19E-15	
Adjusted R-squared	-0.128528	S.D. dependent var	0.745165	

S.E. of regression	0.791605	Akaike info criterion	2.486960
Sum squared resid	43.86470	Schwarz criterion	2.784714
Log likelihood	-89.47841	Hannan-Quinn criter.	2.606338
F-statistic	0.000300	Durbin-Watson stat	1.987253
Prob(F-statistic)	1.000000		

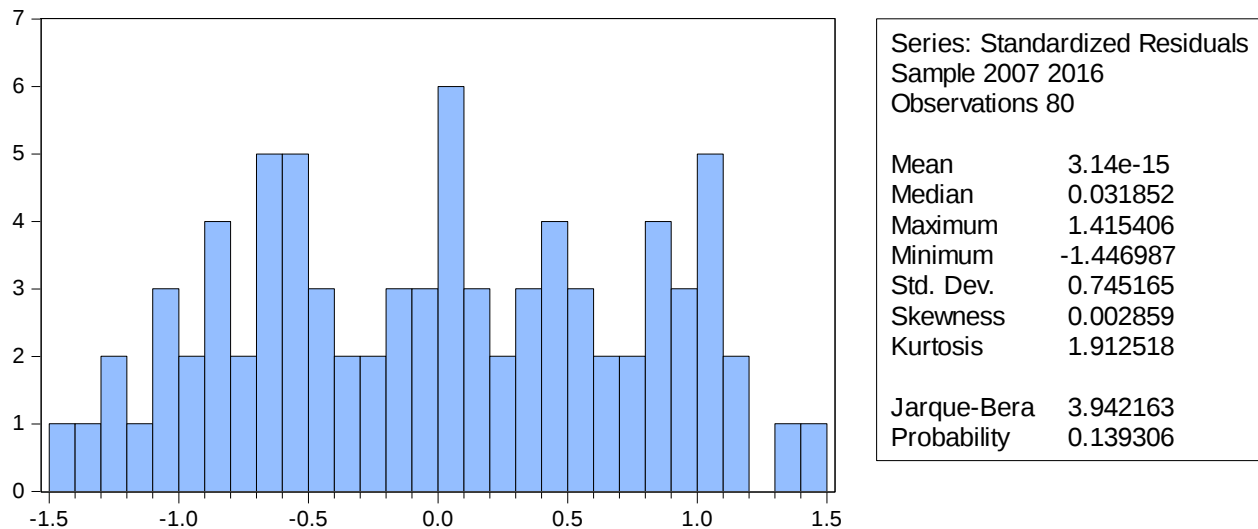
Source: own computation from secondary data from banks annual report using Eview9

In the first table of output, EViews offers two versions of the test – an F-version and a χ^2 version, while the second table presents the estimates from the auxiliary regression up to the 2nd lagged values. The conclusion from both versions of the test in this case is that the null hypothesis of no autocorrelation should not be rejected. This means there is no autocorrelation between error terms of all the explanatory variables in the study of the determinants of NPLs in commercial banks in Ethiopia.

4.1.3.4. Test for Normality Assumption

The disturbances are normally distributed. One of the most commonly applied tests for normality is the Bera—Jarque test. BJ uses the property of a normally distributed random variable that the entire distribution is characterized by the first two moments-- the mean and the variance. The standardized third and fourth moments of a distribution are known as its *skewness* and *kurtosis*. Skewness measures the extent to which a distribution is not symmetric about its mean value and kurtosis measures how fat the tails of the distribution are. A normal distribution is not skewed and is defined to have a coefficient of kurtosis of 3.

Figure 4.1: **Normality Test result**



Source Eview8 result of the regression analysis

From the result of the regression analysis above, Jarque-Bera probability statistics not significant event 13.9 % level of significant because the P-value is 0.139. Therefore, the error term is normally distributed and the normality assumption is not violated. I.e. the Null hypothesis of “the error term is normally distributed” is cannot be rejected

4.1.3.5. Test for Multicollinearity Assumption

An implicit assumption that is made when using the OLS estimation method is that the explanatory variables are not correlated with one another.

According to Brooks (2008), Collinearity is a linear association between two explanatory variables and two variables are perfectly collinear if there is an exact linear relationship between them. Multicollinearity is a phenomenon in which two or more predictor variables in a multiple regression model are highly correlated, meaning that one can be linearly predicted from the others with a substantial degree of freedom (Brooks 2008).

Table: 4.5 result of Multicollinearity between independent variables

	RIR	XRATE	INF	ROE	GDP	LOAN	ROA
RIR	1.000000	0.077764	-0.265235	-0.091946	-0.404571	-0.142021	-0.206512
XRATE	0.077764	1.000000	-0.420051	-0.305069	-0.629191	0.070073	-0.231888
INF	-0.265235	-0.420051	1.000000	0.077491	-0.102176	-0.018496	0.081336
ROE	-0.091946	-0.305069	0.077491	1.000000	0.326958	-0.126339	0.478503
GDP	-0.404571	-0.629191	-0.102176	0.326958	1.000000	-0.065912	0.304866
LOAN	-0.142021	0.070073	-0.018496	-0.126339	-0.065912	1.000000	0.060110
ROA	-0.206512	-0.231888	0.081336	0.478503	0.304866	0.060110	1.000000

Source Eview8 result of the regression analysis

From the above result (table 4.5), the researcher has concluded that there is no indication of perfect multicollinearity between the independent variables. Only the relationships between GDP growth rate and exchange rate showed coefficient of 0.63. This is an indication of the absence of multicollinearity between the explanatory variable in the research study. Thus, the assumption of no multicollinearity is not violated. Therefore, the researcher concluded that there is no linear association between the explanatory variables included in the study of the determinants of NPLs.

4.1.3.6. Test for Linearity of the Model

The Ramsey RESET test for this regression is in effect testing whether the relationship between the NPLs and the explanatory variables is linear or not. The results of this test for one fitted term are shown in the following table (4.6). Both F - and χ^2 versions of the test are presented, and it can be seen that there is no apparent non-linearity in the regression equation and so it would be concluded that the linear model for the NPLS is appropriate.

Table: 4.6 Test for linearity

Ramsey RESET Test

Equation: UNTITLED

Specification: NPL C RIR XRATE INF ROE GDP LOAN ROA

Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.896110	71	0.3732
F-statistic	0.803014	(1, 71)	0.3732
Likelihood ratio	0.899726	1	0.3429

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.490583	1	0.490583
Restricted SSR	43.86639	72	0.609255
Unrestricted SSR	43.37581	71	0.610927

LR test summary:

	Value	df
Restricted LogL	-89.47995	72
Unrestricted LogL	-89.03009	71

Unrestricted Test Equation:

Dependent Variable: NPL

Method: Least Squares

Date: 05/25/17 Time: 08:29

Sample: 1 80

Included observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.80085	5.060946	2.331748	0.0226
RIR	0.314717	0.191033	1.647447	0.1039
XRATE	-0.208773	0.097862	-2.133334	0.0364
INF	-0.011190	0.014473	-0.773173	0.4420
ROE	-0.013032	0.008336	-1.563337	0.1224
GDP	-0.058227	0.181183	-0.321371	0.7489
LOAN	-0.039105	0.016208	-2.412727	0.0184
ROA	-0.330494	0.174111	-1.898180	0.0617
FITTED^2	0.028206	0.031477	0.896110	0.3732

R-squared	0.784132	Mean dependent var	4.579111
Adjusted R-squared	0.759809	S.D. dependent var	1.594836
S.E. of regression	0.781618	Akaike info criterion	2.450752
Sum squared resid	43.37581	Schwarz criterion	2.718730
Log likelihood	-89.03009	Hannan-Quinn criter.	2.558192
F-statistic	32.23807	Durbin-Watson stat	2.014998
Prob(F-statistic)	0.000000		

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

The main objective of this research was to identify determinants of nonperforming loans in commercial banks in Ethiopia. Based on this objective a number of non performing loan determinants are analyzed from existing literature and different empirical studies are referred by the researcher.

To achieve this broad objective, the study used quantitative research approach. More specifically, the documents of bank reports and NBE annual reports on the macro and bank specific determinants of nonperforming loan in Ethiopia were analyzed.

In recent years many banks in Ethiopia experienced a rapid deterioration in assets' quality, leading to substantial losses and reduction of capital buffers. The fast increase in NPLs not only increased banks' vulnerability to further shocks but also limited their lending operations with broader repercussions for economic activity.

While the paper's main findings should be treated with caution as they are subject to caveats, including those that arise from the NPLs' data quality and differences in the classification of NPLs across banks. With this in mind, the paper finds that the level of NPLs can be attributed to both macroeconomic and banks' specific factors. In particular, the results confirm that:

- The level of NPLs tends to increase when real GDP decreased. As per the hypothesis developed for the study, there is a negative relationship between NPL and real GDP. This clearly indicated that when the overall economy is good, borrowers business will benefit from the economy growth and increase the capacity to fulfill their obligation. I.e. they will pay the loan repayments and avoid loan default.
- The level of NPLs tends to decrease when the level of inflation increased. In other word, at period of inflation, there will be excess money in the economy due to decreased in purchasing power, however, the loan repayment amount is fixed as per the contract, and the borrower will pay the same amount. Thus, NPL will decline as inflation increased.

- The level of NPLs will increase when the exchange rate between Ethiopian Birr and US dollar decreased. The result is different from most empirical studies in Europe, USA, and Middle East. This difference is happened due to difference in our economic environment and the financial system which is very restrictive.

When the economy characterized by free trade between countries and there is foreign banks, there may be lending and borrowing in terms of foreign currencies. In this case an increase in the change in exchange rate against US dollar will increase the level of NPLs since the local borrower fail to pay due to the burden of deterioration of birr. But, when the country's source of foreign currency is from export related business, the relationship between exchange rate and NPLs is negative.

- Real interest rate shows price of loans and real cost which are incurred by economic agents. It is the difference between average lending interest rate and inflation rate of the country. For this reason, the change of real interest rate will influence individuals' and enterprises' debt payment to commercial banks. In this study, the result showed that NPLs and real interest rate has positive relationship which is agreed with the literature and empirical studies.
- Higher quality of the bank's management, as measured by the previous period's profitability (ROA and ROE), leads to lower NPLs in commercial banks in Ethiopia. The result suggested that better managed banks have, on average, better quality of assets (corroborating the "bad management" hypothesis.). This indicated that the level of profitability of commercial banks (return on asset and return on equity) determine the level of nonperforming loans of commercial banks in Ethiopia.
- As per the existing literature and empirical studies, the growth rate of bank's loans was found to contribute to higher NPLs in the subsequent periods. But, the study result showed the opposite. An increase in loan will result in decline in the level of NPLs in commercial banks in Ethiopia. This indicated that further study will be under taken specially, in relation to the disbursement time if it is at the end of the fiscal year. I.e. if high disbursement rate is observed at year end, for example, in the month of June, the NPLs ratio will automatically decline. Because the denominator (total loan) increase without change in the nominator (NPL). In this scenario, increase in loan will result in decline in ratio of nonperforming loan.

- The health of a vibrant economy largely depends upon a healthy banking system, which in turn depends upon a sound asset structure. When the loan portfolios of a bank get contaminated by bad and doubtful debts, we say that the bank has created Non-performing Loans. When loan accounts are overdue, they neither recover the capital nor earn income in real terms. Such NPLs make the banks sick and unprofitable. This leads to a drain on the social resources.

5.2.Recommendations

The result of the study indicated that ROA, ROE, exchange rate, GDP, Inflation, loan growth rate, and real interest rate are the main determinants of NPLs in commercial banks in Ethiopia.

The result also suggested that an increase in NPLs has a significant impact on credit, real GDP growth, and inflation in the periods ahead, thus are validating the notion that a healthy and sustainable growth cannot be achieved without a sound and resilient banking system.

Based on the research finding, the researcher provided the following recommendations:

- Ethiopian commercial banks should pay more attention to the above factors, which have been discussed in the finding, when providing loans in order to curtail the level of impaired loans.
- The commercial banks should also take the performance of the real economy into account when extending loans given the reality that loan delinquencies are likely to be high during economy downturn.
- Government should work hard on to increase the GDP growth rate which reduce the level of NPLs commercial banks in Ethiopia
- When bank's ROE and ROA decline, non performing loans in commercial banks will increase. Therefore, bank's management should focus on strategies that increase non-interest income and foreign transactions which in turn increase ROA and ROE.
- Ethiopian commercial banks need to take effective measure to strengthen their loan portfolio and reduce their credit risk to insure the stability of the financial system.

- Proper selection of the borrower activity, financing only viable schemes, Extending need based financing, Ensuring proper end-use, proper post-sanction follow-up, regular contact with borrowers and regular monitoring of the accounts.
- The Government, bank managements and the employees have to realize the NPLs and make the Ethiopian banking system more transparent, more vibrant and more socially responsible with internationally acceptable standards of performance.
- It can be concluded that bank should not only take steps for reducing present NPLs but necessary precautions should also be taken to avoid future NPLs.

5.3.Policy Implications

Lastly, the paper's findings have some policy implications:

- First, given the adverse effect of NPLs on the broad economy and also in view of the significant contribution of bank-level factors to NPLs, there is merit to strengthen supervision to prevent a sharp buildup of NPLs in the future, including by ensuring that banks avoid excessive lending, maintaining high credit standards, and banks should put in place a vibrant credit process that would encompass issues of proper customer selection, robust credit analysis, authentic sanctioning process, proactive monitoring and follow up and clear recovery strategies for sick loans.
- With all these measures, let us hope that wisdom will dawn on all concerned that a healthy banking system is a must for an efficient and vibrant economy. Real freedom lies in responsible behavior of all citizens, particularly with regard to the banking system.

5.4. Recommendation of future Studies

- Since the researcher only sees determinants of NPLs by taking only four macro and three bank specific variables, there may be other variables that can determine NPLs in commercial banks in Ethiopia like Government Expenditure, Import & export of the country, foreign currencies availability, political stability, bad weather conditions and competition in banking industry which are recommended for further studies.

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Appendixes

Appendix A: Regression Result

Dependent Variable: NPL

Method: Panel Least Squares

Date: 05/25/17 Time: 00:53

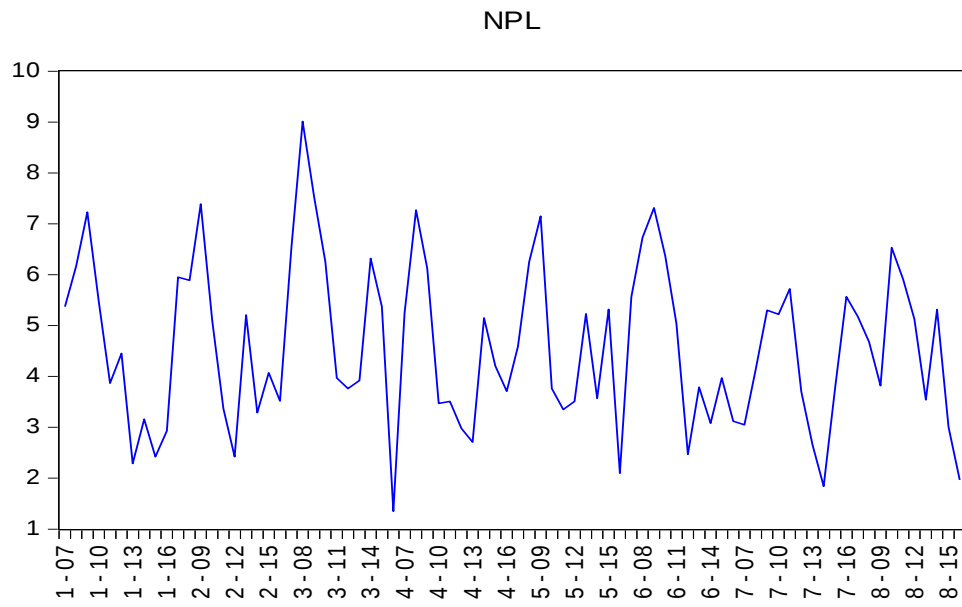
Sample: 2007 2016

Periods included: 10

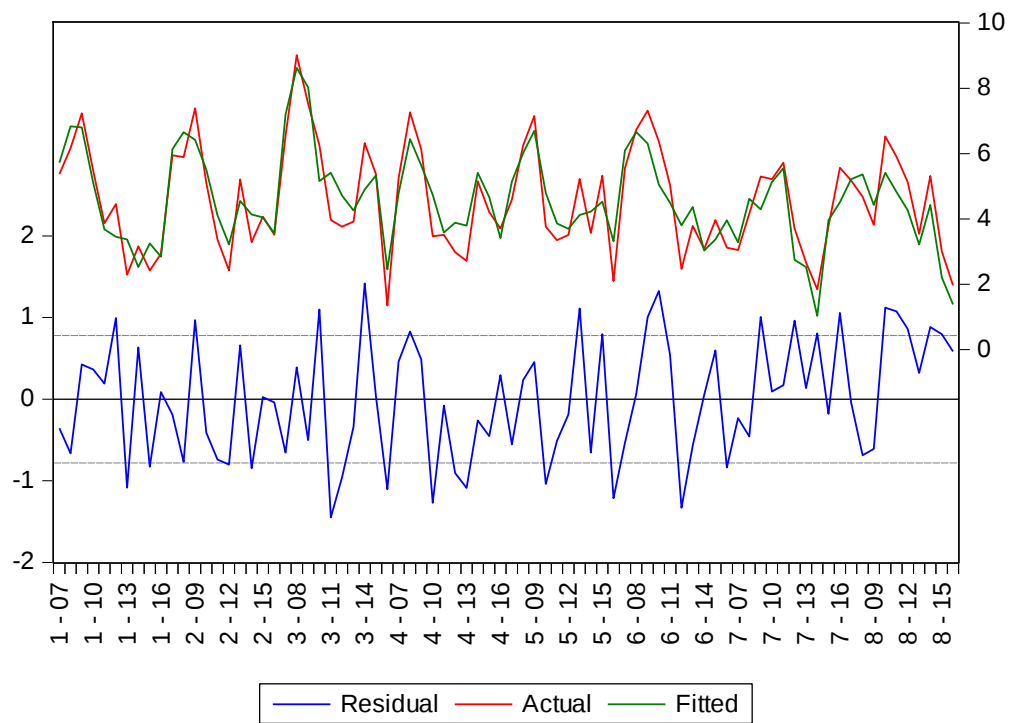
Cross-sections included: 8

Total panel (balanced) observations: 80

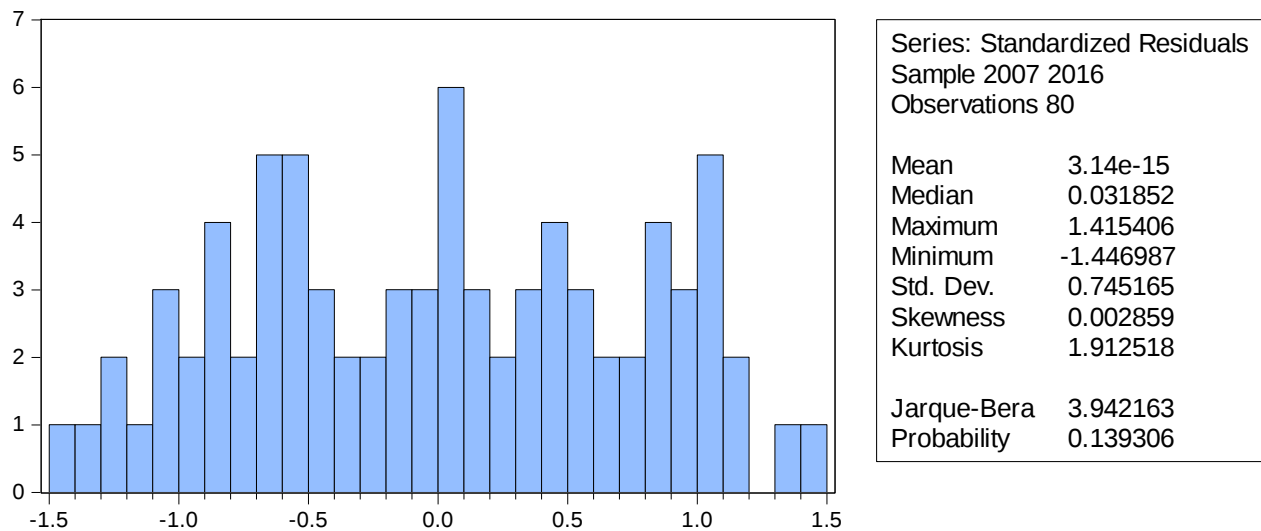
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.49840	2.926430	5.296010	0.0000
RIR	0.432867	0.138048	3.135624	0.0025
XRATE	-0.287755	0.042470	-6.775510	0.0000
INF	-0.014636	0.013933	-1.050436	0.2970
ROE	-0.015064	0.008011	-1.880476	0.0641
GDP	-0.097370	0.175598	-0.554506	0.5810
LOAN	-0.052155	0.007104	-7.341715	0.0000
ROA	-0.470821	0.076005	-6.194572	0.0000
R-squared	0.781690	Mean dependent var	4.579111	
Adjusted R-squared	0.760466	S.D. dependent var	1.594836	
S.E. of regression	0.780548	Akaike info criterion	2.436999	
Sum squared resid	43.86639	Schwarz criterion	2.675201	
Log likelihood	-89.47995	Hannan-Quinn criter.	2.532501	
F-statistic	36.82956	Durbin-Watson stat	2.040723	
Prob(F-statistic)	0.000000			



Appendix B: Residual Graphs



Appendix C: Normality test result



Appendix D: Test result for existence of Autocorrelation between residual values.

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.001349	Prob. F(2,70)	0.9987
Obs*R-squared	0.003083	Prob. Chi-Square(2)	0.9985

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 05/25/17 Time: 08:16

Sample: 1 80

Included observations: 80

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.038762	3.060913	0.012663	0.9899
RIR	0.001721	0.143954	0.011955	0.9905

XRATE	-0.000527	0.044282	-0.011907	0.9905
INF	-0.000152	0.014457	-0.010481	0.9917
ROE	-4.27E-05	0.008174	-0.005220	0.9959
GDP	-0.001781	0.181399	-0.009818	0.9922
LOAN	-0.000141	0.007711	-0.018227	0.9855
ROA	0.000160	0.077144	0.002077	0.9983
RESID(-1)	-0.000507	0.122172	-0.004149	0.9967
RESID(-2)	0.006815	0.131963	0.051643	0.9590

R-squared	0.000039	Mean dependent var	5.19E-15
Adjusted R-squared	-0.128528	S.D. dependent var	0.745165
S.E. of regression	0.791605	Akaike info criterion	2.486960
Sum squared resid	43.86470	Schwarz criterion	2.784714
Log likelihood	-89.47841	Hannan-Quinn criter.	2.606338
F-statistic	0.000300	Durbin-Watson stat	1.987253
Prob(F-statistic)	1.000000		

Appendix E: Heteroskedasticity Test: White

F-statistic	0.790192	Prob. F(7,72)	0.5978
Obs*R-squared	5.707466	Prob. Chi-Square(7)	0.5743
Scaled explained SS	2.109308	Prob. Chi-Square(7)	0.9535

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 05/25/17 Time: 08:18

Sample: 1 80

Included observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.160030	1.367247	0.848442	0.3990
RIR^2	0.005680	0.015577	0.364624	0.7165
XRATE^2	-0.000250	0.001197	-0.209040	0.8350

INF^2	4.33E-06	0.000292	0.014855	0.9882
ROE^2	-3.00E-05	5.94E-05	-0.504355	0.6156
GDP^2	-0.004737	0.007736	-0.612293	0.5423
LOAN^2	-1.84E-05	8.18E-05	-0.224396	0.8231
ROA^2	-0.002356	0.005477	-0.430230	0.6683

R-squared	0.071343	Mean dependent var	0.548330
Adjusted R-squared	-0.018943	S.D. dependent var	0.527101
S.E. of regression	0.532070	Akaike info criterion	1.670557
Sum squared resid	20.38312	Schwarz criterion	1.908760
Log likelihood	-58.82230	Hannan-Quinn criter.	1.766060
F-statistic	0.790192	Durbin-Watson stat	2.155970
Prob(F-statistic)	0.597833		

Appendix F: Test for the existence of multicollinearity

	RIR	XRATE	IN	ROE	GDP	LOAN	ROA
RIR	1.000000	0.077764	-0.265235	-0.091946	-0.404571	-0.142021	-0.206512
XRATE	0.077764	1.000000	-0.420051	-0.305069	-0.629191	0.070073	-0.231888
INF	-0.265235	-0.420051	1.000000	0.077491	-0.102176	-0.018496	0.081336
ROE	-0.091946	-0.305069	0.077491	1.000000	0.326958	-0.126339	0.478503
GDP	-0.404571	-0.629191	-0.102176	0.326958	1.000000	-0.065912	0.304866
LOAN	-0.142021	0.070073	-0.018496	-0.126339	-0.065912	1.000000	0.060110
ROA	-0.206512	-0.231888	0.081336	0.478503	0.304866	0.060110	1.000000

Appendix G: Test for model Linearity

Ramsey RESET Test

Equation: UNTITLED

Specification: NPL C RIR XRATE INF ROE GDP LOAN ROA

Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.896110	71	0.3732
F-statistic	0.803014	(1, 71)	0.3732
Likelihood ratio	0.899726	1	0.3429

F-test summary:

Sum of Sq.	df	Mean
------------	----	------

	Squares		
Test SSR	0.490583	1	0.490583
Restricted SSR	43.86639	72	0.609255
Unrestricted SSR	43.37581	71	0.610927

LR test summary:

	Value	df
Restricted LogL	-89.47995	72
Unrestricted LogL	-89.03009	71

Unrestricted Test Equation:

Dependent Variable: NPL

Method: Least Squares

Date: 05/25/17 Time: 08:29

Sample: 1 80

Included observations: 80

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.80085	5.060946	2.331748	0.0226
RIR	0.314717	0.191033	1.647447	0.1039
XRATE	-0.208773	0.097862	-2.133334	0.0364
INF	-0.011190	0.014473	-0.773173	0.4420
ROE	-0.013032	0.008336	-1.563337	0.1224
GDP	-0.058227	0.181183	-0.321371	0.7489
LOAN	-0.039105	0.016208	-2.412727	0.0184
ROA	-0.330494	0.174111	-1.898180	0.0617
FITTED^2	0.028206	0.031477	0.896110	0.3732

R-squared	0.784132	Mean dependent var	4.579111
Adjusted R-squared	0.759809	S.D. dependent var	1.594836
S.E. of regression	0.781618	Akaike info criterion	2.450752
Sum squared resid	43.37581	Schwarz criterion	2.718730
Log likelihood	-89.03009	Hannan-Quinn criter.	2.558192
F-statistic	32.23807	Durbin-Watson stat	2.014998
Prob(F-statistic)	0.000000		

Appendix H: LISTS OF PRIVATE COMMERCIAL BANKS IN ETHIOPIA

s.n	Name of Bank Branches	Year year of establishment	No. of branches as of June 2016
1	Awash International Bank	1994	245
2	Dashen Bank	1995	118
3	Bank of Abyssinia 1996	1996	176
4	Wegegan Bank	1997	161
5	Unite Bank	1998	144
6	Nib International Bank	1999	155
7	Cooperative bank of Oromia	2004	184
8	Lion International Bank	2006	121
9	Zemen Bank	2008	210
10	Oromia International Bank	2008	213
11	Bunna International Bank	2009	105
12	Berhan International Bank	2009	88
13	Abay Bank S. C.	2011	116
14	Addis International Bank	2011	43
15	Debub Global Bank	2012	28
16	Enat Bank	2012	20

Appendix I: RAW DATA

Year	Bank	NPL	GDP	XRATE	RIR	INF	LOAN	ROA	ROE
2007	AIB	5.37	11.79	8.79	3.32	15.82	13.06	6.01	60.65
2008	AIB	6.17	11.19	9.24	2.43	25.30	11.05	4.72	46.15
2009	AIB	7.23	10.05	10.42	3.37	36.40	9.98	3.59	33.98
2010	AIB	5.47	10.57	12.89	4.38	2.80	16.90	4.54	46.23
2011	AIB	3.87	11.40	16.12	3.11	18.10	25.26	5.03	51.39
2012	AIB	4.45	8.70	17.25	2.75	34.10	35.62	4.39	41.11
2013	AIB	2.29	9.90	18.19	3.17	13.50	39.16	3.77	35.65
2014	AIB	3.16	10.35	19.07	3.41	8.10	44.32	4.16	40.65
2015	AIB	2.42	10.40	20.10	1.43	7.70	47.87	3.64	33.93
2016	AIB	2.93	8.00	21.17	5.22	9.70	23.65	3.50	33.16
2007	DB	5.95	11.79	8.79	3.32	15.82	16.02	4.72	63.23
2008	DB	5.89	11.19	9.24	2.43	25.30	9.38	4.81	60.57
2009	DB	7.39	10.05	10.42	3.37	36.40	9.49	4.01	48.31
2010	DB	5.10	10.57	12.89	4.38	2.80	11.65	4.15	49.90
2011	DB	3.37	11.40	16.12	3.11	18.10	19.09	4.67	55.36
2012	DB	2.42	8.70	17.25	2.75	34.10	23.43	5.56	62.18

2013	DB	5.21	9.90	18.19	3.17	13.50	8.33	4.36	45.81
2014	DB	3.29	10.35	19.07	3.41	8.10	8.23	4.59	44.99
2015	DB	4.07	10.40	20.10	1.43	7.70	27.06	4.13	37.93
2016	DB	3.52	8.00	21.17	5.22	9.70	9.20	3.56	33.76
2007	BOA	6.54	11.79	8.79	3.32	15.82	15.56	3.05	47.20
2008	BOA	9.01	11.19	9.24	2.43	25.30	16.80	0.57	37.12
2009	BOA	7.53	10.05	10.42	3.37	36.40	1.91	2.20	24.30
2010	BOA	6.26	10.57	12.89	4.38	2.80	29.09	3.33	38.36
2011	BOA	3.97	11.40	16.12	3.11	18.10	5.16	3.81	43.90
2012	BOA	3.76	8.70	17.25	2.75	34.10	17.55	3.71	40.94
2013	BOA	3.92	9.90	18.19	3.17	13.50	20.64	3.83	39.31
2014	BOA	6.32	10.35	19.07	3.41	8.10	9.60	3.28	30.27
2015	BOA	5.37	10.40	20.10	1.43	7.70	16.34	3.00	25.03
2016	BOA	1.35	8.00	21.17	5.22	9.70	35.46	3.19	27.88
2007	WB	5.25	11.79	8.79	3.32	15.82	8.00	7.72	86.93
2008	WB	7.27	11.19	9.24	2.43	25.30	12.19	5.34	48.73
2009	WB	6.13	10.05	10.42	3.37	36.40	11.10	5.67	42.77
2010	WB	3.47	10.57	12.89	4.38	2.80	14.61	5.84	38.08
2011	WB	3.51	11.40	16.12	3.11	18.10	14.99	6.64	42.83
2012	WB	2.98	8.70	17.25	2.75	34.10	18.39	5.59	34.44
2013	WB	2.71	9.90	18.19	3.17	13.50	23.98	4.79	28.17
2014	WB	5.15	10.35	19.07	3.41	8.10	- 1.86	3.73	22.35
2015	WB	4.21	10.40	20.10	1.43	7.70	25.37	3.54	21.19
2016	WB	3.71	8.00	21.17	5.22	9.70	19.15	3.20	20.33
2007	UN	4.59	11.79	8.79	3.32	15.82	40.45	4.13	63.16
2008	UN	6.25	11.19	9.24	2.43	25.30	31.85	4.49	35.39
2009	UN	7.15	10.05	10.42	3.37	36.40	15.77	3.34	29.08
2010	UN	3.76	10.57	12.89	4.38	2.80	21.40	4.70	46.24
2011	UN	3.35	11.40	16.12	3.11	18.10	25.38	4.74	47.92
2012	UN	3.51	8.70	17.25	2.75	34.10	24.67	4.93	45.96
2013	UN	5.23	9.90	18.19	3.17	13.50	23.20	3.99	34.74
2014	UN	3.57	10.35	19.07	3.41	8.10	24.08	3.19	28.43
2015	UN	5.32	10.40	20.10	1.43	7.70	35.33	2.65	23.72
2016	UN	2.10	8.00	21.17	5.22	9.70	24.04	2.71	25.39
2007	NIB	5.56	11.79	8.79	3.32	15.82	19.24	4.57	59.72
2008	NIB	6.73	11.19	9.24	2.43	25.30	13.67	5.08	36.70

2009	NIB	7.31	10.05	10.42	3.37	36.40	3.98	5.20	37.45
2010	NIB	6.37	10.57	12.89	4.38	2.80	13.44	5.31	38.49
2011	NIB	5.04	11.40	16.12	3.11	18.10	11.56	5.27	36.97
2012	NIB	2.47	8.70	17.25	2.75	34.10	25.41	5.06	32.51
2013	NIB	3.79	9.90	18.19	3.17	13.50	18.36	4.34	24.42
2014	NIB	3.08	10.35	19.07	3.41	8.10	17.75	6.22	34.76
2015	NIB	3.97	10.40	20.10	1.43	7.70	20.98	6.17	39.66
2016	NIB	3.12	8.00	21.17	5.22	9.70	8.59	3.16	22.19
2007	CBO	3.05	11.79	8.79	3.32	15.82	47.41	8.02	40.94
2008	CBO	4.16	11.19	9.24	2.43	25.30	25.81	8.17	34.48
2009	CBO	5.30	10.05	10.42	3.37	36.40	40.82	5.53	33.57
2010	CBO	5.22	10.57	12.89	4.38	2.80	40.82	2.58	23.38
2011	CBO	5.72	11.40	16.12	3.11	18.10	9.70	3.19	38.86
2012	CBO	3.70	8.70	17.25	2.75	34.10	42.21	4.54	60.80
2013	CBO	2.66	9.90	18.19	3.17	13.50	34.62	5.23	61.98
2014	CBO	1.84	10.35	19.07	3.41	8.10	43.00	6.86	59.95
2015	CBO	3.77	10.40	20.10	1.43	7.70	18.69	5.11	42.13
2016	CBO	5.57	8.00	21.17	5.22	9.70	21.97	0.34	27.32
2007	LIB	5.18	11.79	8.79	3.32	15.82	34.20	5.64	32.84
2008	LIB	4.68	11.19	9.24	2.43	25.30	58.94	3.57	13.48
2009	LIB	3.82	10.05	10.42	3.37	36.40	61.29	3.54	15.88
2010	LIB	6.53	10.57	12.89	4.38	2.80	18.89	4.32	26.25
2011	LIB	5.91	11.40	16.12	3.11	18.10	20.33	3.91	27.19
2012	LIB	5.13	8.70	17.25	2.75	34.10	25.79	4.17	27.83
2013	LIB	3.54	9.90	18.19	3.17	13.50	26.36	5.56	34.45
2014	LIB	5.31	10.35	19.07	3.41	8.10	15.62	3.84	23.40
2015	LIB	3.01	10.40	20.10	1.43	7.70	45.73	5.83	42.14
2016	LIB	1.97	8.00	21.17	5.22	9.70	34.43	5.01	45.77