DETERMINANTS OF NONPERFORMING LOAN: IN SELECTED ETHIOPAN COMMERCIAL BANKS.

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DECLARATION

I, Gelila G/tsadik, hereby declare that this thesis entitled "Determinants of non-performing loan in selected Ethiopia Commercial Banks" is my own work except where otherwise indicated and acknowledged. This thesis has been carried out by me under the guidance and supervision of Dr. Mathewos Kebede and Ato Monanol Terefa.The thesis is original and has not been submitted for the award of degree or diploma in any university or institution.

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CERTIFICATE

This is to certify that the thesis entities "Determinants of nonperforming loan in selected Commercial Ethiopian Commercial Banks" submitted to Jimma University for the award of the Degree of Master of Science in Accounting and Finance is a record of Valuable research work carried out by Gelila G/tsadik Tekalign, under our guidance and supervision. Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.

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APPROVAL SHEET

As members of the Examining Board of the Final Open Defence, we certify that we have read and evaluated the thesis prepared by Gelila G/tsadik, entitled “Determinants of nonperforming loan in Selected Ethiopian Commercial Banks”, and recommend that it be accepted as fulfilling the thesis requirements for the award of the degree in Master of science in Accounting and Finance.

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ABSTRACT

The major focus of this study is to empirically identify determinants of nonperforming loans in selected commercial banks in Ethiopia. The study covered 9commercial banks which had issued annual reports for 10 years (2010-2018). The secondary data on NPL and bank specific factors were collected from the annual reports and other relevant documents of banks under study. Moreover data on the macroeconomic factors was collected from reports of NBE. A panel data model, with its pooled ols, fixed effect model and random effect estimate, was applied to test hypotheses in the study.

Based on finding, it has been concluded that return on asset is negative and statistically significant at 1% significance level, return on equity is positive statistically significance 1% significance level, lending rate positive 10% significance level. And loan to deposit ratio 5 percentage significant level. Bank size, GDP, and inflation are showed a positive and highly significant at 1% significance level, exchange rate turn out to be positive and significance association with of non-performing loan at 5% significance level. Hence, the researcher recommends that by focusing on these variables the firm can reduce the probability of nonperforming loans in Ethiopian commercial banks.

Keyword: NPL, commercial banks, panel data analysis, Ethiopia

ACCRONOMYS

NPLs	Non Performing Loan
NBE	National bank of Ethiopia
ROA	Return on Asset
ROE	Return on equity
LDR	Loan Deposit Ratio
LR	Lending Rate
ER	Exchange Rate
DB	Dashen Bank
AIB	Awash International Bank
BOA	Bank of Abyssinia
WB	Wegagen Bank
UB	United Bank
LIB	Lion International Bank
CBO	Cooperative Bank of Oromia
NIB	Nibe International Bank
ZB	Zemen Bank
OIB	Oromia International Bank
BIB	Bunna International Bank
BRIB	Berhane International Bank
CBE	Commercial bank of Ethiopia
GDP	Growth domestic product
IN	Inflation

CHAPTER ONE

1 INTRODUCTION

This chapter discusses the background information on the study. The balance of the chapter is organized as follows. The first section sets out problem statement. The second section provides the research objective. The hypothesis used is presented in section three. Significance of the study and scope of the study are presented in section four, and five.

1.1 Background of the study

Commercial banks play a central role in commercial based lending in many global nations. In banking system, loans are normally considered as the main assets and vital source of revenue for the commercial banks. However, the quantity or percentage of non-performing loans (NPL) of commercial banks is a major cause of bank failures and financial crises in both developing and developed countries.

The issue of non-performing loans (NPL) has gained increasing attentions in the last few decades. The immediate consequence of large amount of NPL in the banking system is bank failure (demirguc-kunt), (barr,p and siems 1994) found out that asset quality is a statically significant predictor of insolvency and that failing banking institutions always have high level of NPL prior to failure.According to international monetary fund (IMF, 2009) NPL is any loan in which interest and principal payments are overdue for 90 days or more. On the other hand the (Basel committee, 1997) puts NPL as loans left unpaid for a period of 90 days therefore NPL refer to those as financial assets from which banks no longer receive interest or instalment payments as schedule, non-performing loans can be used to mark the onset of bank crisis.

Despite on-going efforts to control bank lending activities NPL are still a major concern for both international and local regulators, they are known as non-performing because the loan ceases to 0perform or generate income for the bank according to national bank of Ethiopians directive NO SBB/43/2008.Asset classification and provisioning directive non –performing means loans or advances whose credit quality has deteriorate.The banking sector stability depends in large part on the size of non-performing loans (NPL) hence, the factors which explain the problem loans are very useful information for banks.

The principal aim of any business is to make profits. That is why any asset created introduces business, since this issue is applicable for the banking sector business, banks should give due consideration on the management of loans because lending is the main business of commercial banks. Loans are normally the main assets and vital source of revenue for the commercial banks. Banking sectors can perform worse as a result of inefficient management and poor assets quality. Non-performing asset are also the single largest cause of irritation of banking sectors. Deterioration in asset quality is much more serious problem of bank unless the mechanism exists to ensure the timely recognition of the problem it is a common cause of bank failure, poor asset quality leads non-performing loan that can seriously damage a bank's financial position having an adverse effect on the banks operation (lafu, ente, 2012).

The purpose of this study is to identify and examine factors that determine the occurrence of loan default. As can be seen from the research problem it is more of explanatory type and tries to assess the relationship between occurrence of NPL and some bank specific and macro-economic factors the subsequent discussions hence present more quantitative aspects of this proposed study.NPL proportion is one of the determinants that depict soundness of banking sector. The main objective is identifying and investigating the determinants of nonperforming loans is very vital to minimize loan default.

1.2 Statement of the Problem

As the numbers of challenges emanating from hard economic growth continue to rise, financial institutions as well as the banking sector are exposed consequently to risks that are as well increasing financial institutions in the banking sector often suffer from lending practices that are poorly appropriate. Appropriate steps which include assessment and evaluation are crucial in controlling and mitigating risks associated with lending that is connected, especially when it is going to individuals or companies. The adverse NPL is attributable to the bank manager's adverse selection of its borrowers (Brown bridge, 1998).

NPL are determined by different factors such as level of GDP, inflation, unemployment, volume of deposit, return on equity, return on asset, capital adequacy, total loan, liquidity, bank size, excessive lending, interest rate and credit growth. These factors are studied by different researchers in different countries (Mileris, 2012), Tomak, 2013), Ahmad and Bashir, 2013).

Financial sector of Ethiopian economy is dominated by banking sectors, so it is important to examine their asset quality.

The study of Saba et al. (2012) on the title of "Determinants of Nonperforming Loan on US Banking sector" found negative significant effect of lending rate and positive significant effect of real GDP per capital and inflation rate on NPL via OLS regression model. Similarly, the study of Louzis et al.(2010) examined the determinants of NPLs in the Greek financial sector using Dynamic panel data model and found as real GDP growth rate, ROA and ROE had negative Whereas lending, unemployment and inflation rate had positive significant while loan to deposit Ratio and capital adequacy ratio had insignificant effect on NPLs. However, Swamy (2012) Examined the determinants of NPLs in the Indian banking sector using panel data and found as GDP growth rate, inflation, capital adequacy and bank lending rate have insignificant effect on NPLs.

Shingjergji (2013) who conducted study on "the impact of bank specific factors on NPLs in Albanian banks system" utilized OLS estimation model and found as ROE have significant negative on NPLs. However, Ahmad and Bashir (2013) conducted a study on the "Bank Specific Determinants of Nonperforming Loan" by static panel data model and found as ROE has insignificant negative association with NPLs. Makri et al.(2014) identify the factors affecting NPLs of Eurozone's banking systems through difference Generalized Method of the Moments (GMM) estimation. Accordingly, they found as ROA did not show any significant impact on NPL ratio. However, Selma and Jouini (2013) conducted a study on Italy, Greece and Spain for the period of 2004-2008 via panel data model and found a significant negative effect of ROA on NPLs. similarly, Boudriga et al. (2009) conducted a study on the title "Problem loans in the MENA countries via random-effects panel regression model and found as ROA has significant negative effect on NPLs.

In addition to the above facts, there has not been much research which is conducted to date on the determinants of NPLs in countries with emerging economy like Ethiopia .The study of Wondimagegnehu (2012) was assessed the bank specific factors affecting NPLs via OLS estimation model by the help of SPSS software. However, this study considers both macroeconomic factors such as inflation rate, tax rate and

Lending rate and, bank specific factors like loan to deposit ratio, ROE, ROA and capital adequacy ratio as determinant factors of NPLs. Besides, fixed effect model and version 12 Stata software was used in this study to examine the determinants of NPLs of commercial bank in Ethiopia.

The study will attempt to fill this gap of shortage of literature within the context of Ethiopia secondly, now a days banking industry has grown rapidly there are a few counted researches being done regarding banking industry rapidly changes. Finally, this research will deeply show major variables of the determinants of nonperforming loans.

Banking industry in Ethiopian has its own unique features that distinguish them from other countries' financial markets. One of the features is the regulation of the country does not allow foreign nations or organizations to fully or partially acquire shares of Ethiopian banks, besides there is no secondary market. Moreover, in the country, a rapidly growing industry is the banking sector. As a result, it is visible to conduct a study on the determinants of NPL of commercial banks in Ethiopia which is crucial.

The purpose of this study to examine the determinants of NPL of commercial banks in Ethiopia. This study provide real information about the determinants factors affecting NPL of the commercial banks and feasible recommendation for the impact of identified variables on the levels of NPL. Bank specific factors are variables that are under the central of bank management they can be directly / indirectly stated in the financial statement of banks. Macro-economic factors are variables are related with the fiscal and monetary policies of the country. The researcher motivation in this thesis is In the Ethiopian; a rapidly growing industry is the banking sector, regulation of the country is not allowed foreign nations or organization to fully or partially acquire share of Ethiopian banks, there is no secondary market moreover and a study on the determinants of NPL of commercial banks in Ethiopia which is crucial. The research have concerns financial sector of Ethiopian economy is dominated by banking sector ,banking sector often suffer from lending practices that are poorly appropriate.

1.3 Objective of the study

1.3.1 General objective

The purpose of this study is to investigate the determinants of non-performing loans in the case of selected Ethiopian commercial banks.

1.3.2 Specific Objectives

- To examine the banks specific determinants of nonperforming loans (NPL) of commercial banks in Ethiopia. These are Return on asset, Return on equity, Loan to deposit ratio, Lending rate, Bank size.
- To examine macroeconomic determinants of nonperforming loans (NPL) of commercial banks in Ethiopia. These are GDP, Inflation, Exchange rate.

1.4 Research hypothesis

To achieve the objective of this study, the researcher has formulated four hypotheses concerning the determinants of nonperforming loans on the selected commercial bank in Addis Ababa city administration, Ethiopia. The empirical studies made around the world demonstrate various outcomes on determinants of nonperforming loans of the financial sector. From the review of empirical literature, the researcher perceived as there is no consistency in the results for the determinants of nonperforming loans.

From Ethiopian context, Wondemagegehu (2012) and Gadise (2013) on the title of "Determinants of Nonperforming Loans of Banking sector in Ethiopia" found that interest rate has no impact on the levels of NPLs via OLS regression model. However, the study of Saba et al. (2012) on the title of "Determinants of Nonperforming loan on US Banking sector" found negative significant effect of lending rate and positive significant effect of real GDP per capita and inflation rate,interest rate on NPL via OLS regression model. Similarly, the study of Louzis et al.(2010) examined the determinants of NPLs in the Greek financial sector using dynamic panel data model and found as real GDP growth rate, ROA and ROE had negative whereas lending, unemployment and inflation rate had positive significant while loan to deposit ratio and capital adequacy ratio had insignificant effect on NPLs. However, Swamy (2012) examined the determinants of NPLs in the Indian banking sector using panel data and found that GDP growth rate, inflation, capital adequacy and bank lending rate have insignificant effect on NPLs. According to Shingjergji (2013) and Boudriga et al. (2009) ROA has a significant negative effect

on NPLs whereas Makri et al. (2014) found that ROA did not show any significant impact on NPL ratio. Based on reviewed related literature, the researcher develops the following null hypothesis to estimate the sign relationship of bank specific and macroeconomic determinants with nonperforming loans of commercial banks in Ethiopian based on empirical evidence reviewed in the literature parts.

H 1; *There is a negative and significant relationship between non-performing loan and return on asset.*

H 2; *There is a negative and significant relationship between non-performing loans and return on equity.*

H 3; *There is a positive significant relationship between non-performing loan and loan to deposits ratio*

H 4; *There is a negative significant relationship between nonperforming and lending rate*

H 5; *There is a negative relationship between exchange rate and nonperforming loan*

H 6; *There is a positive relationship between GDP and nonperforming loan*

H 7; *There is a positive relationship between Inflation and nonperforming loan*

H 8; *There is a positive relationship between Size and nonperforming loan*

1.5 Significance of Study

The finding of this study tries to explore factors contributing to NPLs in the case of Ethiopian Banks. As such, the study yields great contributions to research and practice. The study contributes to attributing to the current body knowledge and research regarding factors influencing NPLs. Besides providing further evidence to findings of prior studies, the current study will also have identified a few additional factors that are worth further research and validation.

The other contribution of the current research is in relation to practice. The findings of the current study will help Ethiopian banks get insight on what it takes to improve their loan qualities and the central bank (NBE) to examine its policy in banking supervision pertaining to the asset quality banks shall maintain.

1.6 Scope of the Study

The scope of the study is limited to selected Ethiopian commercial banks only and these banks must select that are senior banks and are expected to have more experience on the lending.

Activities the study was to include companies who have at ten-year financial statement data including 2018 and selected 9 banks these are Abyssinia bank (1996), Commercial bank of Ethiopia (1963), Awash international bank (1994), Dashen bank (2003), Development bank of Ethiopia (1909), Nib international bank (1999), United bank (1998), Wegagen bank (1997) and Bunna international bank (2009).

1.6 Organization of the paper

The thesis had been structured into five chapters as follows; following introduction in the first chapter, Chapter two contains a review of the literature including; the theoretical review first section; this is followed, by the review of the previous studies related to the area and conclusion and knowledge gap finally. The research design and methodology is presented in chapter 3.

Specifically, this chapter shows the research sampling method followed by data collection and all are outlined. In chapter four, the results and findings of the study are also discussed. Finally, the last Chapter is enclosing the summary of findings, conclusions drawn and recommendations and areas where further research may be productive.

CHAPTER TWO

2 REVIEW OF RELATED LITERATURES

This chapter focuses on explaining the concept of NPL and its determinants, in line with their definition, different theories of NPL are going to be summarized. In addition to this, a detailed review of empirical studies on the determinants of nonperforming loans is discussed. It is helpful in order to provide the reader with relevant theories and previous studies related to the study area.

2.1 Theoretical literature

2.1.1 The overview of banking system in Ethiopia

The history of banking in Ethiopia dates back to the turn of the century, when, in 1905, the bank of Abyssinia was established in Addis Ababa, under the region of Menelek II this event marked the introduction of banking in the country national bank of Egypt having been entrusted of the project the new institution was character in Cairo and its shares were subscribed in a number of countries besides Ethiopia.

The bank of Abyssinia was given a 50-years concession and was engaged in issuing notes, collecting deposits and granting loans, but its clients were mostly foreign business men and wealthy Ethiopians. A few years later, disappointed by the behaviour of this bank , mainly devoted to profit making rather than promoting economic development , the emperor supported the establishment of a wholly Ethiopian bank , the society national d'ethiopie pour le developpment de I 'agriculture et du commerce hailesellassie , after acceding to the throne in 1930, could not accept the country's issuing bank was foreign – owned and, in agreement with national bank of Egypt , decided liquidation of the bank of Abyssinia. A new bank, the bank Ethiopia under government control, was established in1931 and retained management, staff premises and clients of the old bank. Italian occupation in 1936 brought the liquidation of the bank.

Financial sector was left with three major banks namely; national bank of Ethiopia, commercial bank of Ethiopia and agricultural and development bank during the socialist government. However, following the departure of thedergue regime, the monetary and banking proclamation of 1994 established the national bank of Ethiopia as a legal entity. Banking sectors in Ethiopia

are showing progressive developments in terms of number of branches, total assets, human resources utilization and the like relative to other African developing countries. Currently, numbers of banking sectors in Ethiopia have reached eighteen as shown in the following tables.

Table 2-1Numbers of banking sectors in Ethiopia

NO	Name Of Banks	Year Of Stablemen
1	Abay bank	2010
2	Addis international bank	2011
3	Awash international bank	1994
4	Abyssinia bank	1996
5	Berhan international bank	2010
6	Bunna international bank	2009
7	Commercial bank of Ethiopia	1963
8	Cooperative bank of oromia (s.c)	2005
9	Dashen bank	2003
10	Debub global bank	2012
11	Development bank of Ethiopia	1909
12	Enat bank	2013
13	Lion international bank	2006
14	Nib international bank	1999
15	Oromia international bank	2008
16	United bank	1998
17	Wegagen bank	1997
18	Zemen bank	2009

Source: (NBE, 2018)

Return on assets measures the amount of profit the company generates as a percentage of the value of its total assets. The profit percentage of assets varies by industry, but in general, the higher the ROA the better. For this reason, it is often more effective to compare a company's ROA to that of other companies in the same industry or against its own ROA figures from previous periods. Falling ROA is almost always a problem, but investors and analysts should

bear in mind that the ROA does not account for outstanding liabilities and may indicate a higher profit level than actually derived.

Return on assets (ROA) is a financial ratio that shows the percentage of profit a company earns in relation to its overall resources. It is commonly defined as net income divided by total assets. Net income is derived from the income statement of the company and is the profit after taxes. The assets are read from the balance sheet and include cash and cash-equivalent items such as receivables, inventories, land, capital equipment as depreciated, and the value of intellectual property such as patents. Companies that have been acquired may also have a category called "good will" representing the extra money paid for the company over and above its actual book value at the time of acquisition. Because assets will tend to have swings over time, an average of assets over the period to be measured should be used. Thus the ROA for a quarter should be based on net income for the quarter divided by average assets in that quarter. ROA is a ratio but usually presented as a percentage.

ROA answers the question: "What can you do with the assets that you have available?", The higher the ROA, the better the management. But this measure is best applied in comparing companies with the same level of capitalization. The more capital-intensive a business is, the more difficult it will be to achieve a high ROA. A major equipment manufacturer, for instance, will require very substantial assets simply to do what it does; the same will be true for a power plant or a pipeline. A fashion designer, an ad agency, a software firm, or a publisher may require only minimal capital equipment and will thus produce a high ROA. To compare Microsoft with General Motors on the basis of ROA is to compare apples to oranges. The industry average ROA for software companies in mid-2006 was 13.1 and Microsoft's own stood at 20.1. The industry ROA for autos was 1.1 and GM's was a negative 1.8.

The difference between a highly capitalized business and one running largely on intellectual property or creative assets is that, in the case of failure, the capital-intensive company will still have major assets that can be turned into real money whereas a concept-based enterprise will fail when its art is no longer favoured; it will leave a few computers and furniture behind. Therefore, ROA is used by investors as one of several ways of measuring a company within an industry, comparing it with others playing by the same rules.

Return on equity is calculated by taking a year's worth of earnings and dividing them by the average shareholder equity for that year. The earnings number can come directly from the Consolidated Statement of Earnings in the company's most recent annual filing with the SEC. It can also be figured as the sum of the past four quarters' worth of earnings, or as the average of the past five or 10 years' earnings, or it can even be an annualized figure based on the previous quarter's results. However, investors should be careful not to annualize the results of a seasonal business, in which all of the profit is booked in one or two quarters.

The shareholder-equity number is located on the balance sheet. Simply the difference between total assets and total liabilities, shareholder equity is an accounting convention that represents the assets that the business has generated. It's assumed that assets without corresponding liabilities are the direct creation of the shareholder capital that got the business started in the first place.

The usual way investors will see shareholder equity displayed is as "book value" -- the amount of shareholder equity per share, or the accounting book value of the business beyond its market value or intrinsic economic value. A business that creates a lot of shareholder equity is a sound investment, because the original investors will be repaid with the proceeds that come from the business operations. Businesses that generate high returns relative to their shareholder equity pay their shareholders handsomely and create substantial assets for every dollar invested. These businesses are typically self-funding and require no additional debt or equity investments.

To quickly gauge whether a company is an asset creator or a cash consumer, look at the ROE it generates. By relating the earnings to the shareholder equity, an investor can quickly see how much cash comes from existing assets. If the ROE is 20%, for instance, then 20 cents of assets are created for every dollar originally invested. As additional cash investments increase on the asset side of the balance sheet, the ROE number shows whether additional dollars invested are dollars of return from previous investments.

Loan-deposit ratio (LTD ratio or LDR) is a ratio between the bank’s total loans and total deposits. The ratio is generally expressed in percentage terms if the ratio is lower than one, the bank relies on its own deposits to make loans to its customers, without any outside borrowing. If on the other hand the ratio is greater than one, the bank borrowed money which it re loaned at higher rates, rather than relying entirely on its own deposits. Banks may not be earning an optimal return if the ratio is too low. If the ratio is too high, the banks might not have enough

liquidity to cover any unforeseen funding requirements or economic crises. Banking analysts commonly use metrics for assessing a bank's liquidity.

The LDR is not the only metric used to ascertain a bank's liquidity. Modern banks today have multiple sources of finance beyond equities and deposits. The diversity of financing sources reduces the importance of LDR in determining a bank's health. Basel III which is part of the Basel Accords provides various complementary statistics to measure banking liquidity more comprehensively.

Lending rate is the rate of interest that you have to pay when you are repaying a loan. Exchange rates can a affect borrower's debt servicing capacity through different channels and its impact on nonperforming loans can be positive or negative (Nkusu 2011). The real effective exchange rate (REER) has a positive effect on impaired loans. The result indicates that whenever there is appreciation of the local currency the NPL portfolios of credit institutions are expected to be high. Inflation rate is sustained or continuous rise in the general price level or alternatively, as a sustained or continuous fall in the value of money, increased in can also weaken the loan payment capacity of the borrowers by reducing the real income when salaries/wages are sticky.

GDP

2.1.2 Factors affecting loan

When formulating a loan policy in a bank, there are factors that have to be considered to reduce lending risks and ensure that the product will perform well in the market. There are different things that are addressed.

What factors are considered when formulating a loan policy?

1. **Capital**

The capital being held by a bank provides protective cushioning to ensure that the bank's operations are not affected by any losses incurred. This means that clients are able to conveniently access their deposits even when there are loans that are yet to be cleared. An institution with a rigid capital backing can afford to take more risks by developing a flexible policy with more accommodating features.

2. **Variations in deposits**

Banking institutions have to observe the trend followed by consumers when depositing and making withdrawals or transfers. Conservative measures are then put in place where there are huge fluctuations in available deposits to reduce the effects of any possible risks that are likely to occur. The same scenario is also likely to play out where a bank is experiencing a decline in available savings.

3. **Economic status**

The prevailing economic conditions will also influence policy formulation and a bank located in a stable environment is likely to introduce a very flexible product. If there are projections of political instability in the future, the formulators can play safe by introducing the need to pledge collateral and reducing credit period. These are measures that will help to protect any financing extended to consumers.

4. **Competence of credit officers**

The board involved in the formulation should factor in the experience of the credit officers that are currently working with the bank. In some cases, such officers are only experienced in dealing with some specific loans and their performance can be affected when dealing with other products. A bank with highly experienced loan officers can comfortably introduce a loan policy that will accommodate different needs of consumers.

5. Existing competition

The number of available banking institutions has been rising considerably and the situation has created huge competition for the available lending market. Smaller or newer banks are likely to formulate a loan policy that focuses on market areas that are yet to be tapped into by the bigger and well established institutions. Bigger banks are also likely to lower their standards to capture a wider market.

6. **Consumer needs**

Just like with any other business, banks also have to carry out market analysis to determine the needs of consumers. This then helps to develop products that are tailored to match the identified needs. The needs of consumers therefore have to be considered when formulating a loan policy. Market analysis also helps to determine affordability and plays a vital role in determining the requirements on various products.

Making changes to the policy

After formulating a policy and implementing it, the board may realize that there are some shortcomings that may be affecting performance of certain loan products. These are issues that can be adjusted by making changes to the existing loan policy. There are also other cases that may necessitate such adjustments including:

- Existence of multiple underwritings
- Change of directors or officers listed in the policy
- Omission or change of identified trade areas
- Discontinuation or introduction of products
- Introduction of new regulations

Generally, loan policy formulation is an involving process with numerous variables that need to be factored in. This is also critical since making the wrong decisions can easily affect the bank's performance.

Nonperforming loans

According to IMF'S compilation guide on financial soundness indicators, NPLs is defined as "a loan is non performing when payments equal to 90 days or more have been capitalized refinanced, or delayed by agreement, or payments are less than 90 days overdue, but there are other good reason such as a debtor filing for bankruptcy to doubt that payments will be made in full" (IMF, 2005). The Ethiopian banking regulation also defines NPL as follows

"Non-performing loan and advances are loans whose credit quality has deteriorated and the full collection of principal and /or interest as per the contractual repayment terms of the loan and advances are in question" (NBE, 2008).

According to this directive of NBE, in addition to the aforementioned category of non-performing loans that do not have pre-established repayment program (essentially overdraft loans) shall be nonperforming when:

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

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

Five Cs of nonperforming / bad/ loans

As noted by Mac Donald (2006), there are five Cs of bad credits that represent the issues used to guard against (prevent bad loans).these are;

1, Complacency- refers to the tendency to assume that because things were good in the past, they will be good in the future. For instance, assuming the past loan repayment success since things have always worked out in the past.

2, Carelessness- indicates the poor underwriting typically evidenced by adequate loan documentation, lack of current financial information or other pertinent information in the credit files and lack of protective covenants in the loan agreement. Each of these makes it difficult to monitor a borrower's progress and identify problems before they are unmanageable.

3, Communication ineffectiveness: inability to clearly communicate the bank's objectives and policies. This is when loan problems can rise. Therefore, the bank management must clearly and effectively communicate and enforce the loan policies and loan officers should make the management aware of specific problems with existing loans as soon as they appear.

4, Contingencies- refers to the lender tendency to play down/ignore circumstances in which a loan might be in default. It focuses on trying to make a deal work rather than identifying downside risk.

5, Competition- involves following the competitors action rather than monitoring the banks own credit standards.

Banks, however, still have required expertise, experiences, and customer focus to make them the preferred lender for many types of loan. Lending is not just a matter of making a loan and waiting for repayment; the loan must be monitored and closely supervised to prevent loan losses (Mac Donald, 2006).

Causes for Non-Performing Loans

Causes for non-performing loans are merely varied from bank to bank as well as countries to countries. Even the classification of these causes differ from one bank to another. Some classified them based on the level of the responsibility the causes are classified into two broad groups. These are:

Internal factors

1, Lack of continuous follows up of repayment due to manpower shortage

2, Lack of consultation and communication with defaulter

3, overstating the collateral value at the time of estimation

4, Lack credit information to be gathered from other commercial banks

5, Agency problem

External factors

Diversion of the borrowed fund to other purposes

1, Unavailability of demand and price fluctuation on both local and international markets.

2, Country's economic and political condition

3, Impact of change fiscal and monetary policy

4, insufficient credit awareness

5, Unwilling customer to disclose the information required

6, Unethical computation made between banks

Preventing and Non-Performing Loans

Safety is the watchword in commercial bank lending activities. Bankers want to feel reasonably sure that the principal of their loans will be repaid, even though they may have to be satisfied with relatively low rates of interest because of their selection of only the better risks. Banks deal with problem loans in a variety of ways. The eventual path to collect problem loans depends on how early the problems are discovered. Problems that are discovered early enough can frequently be corrected by restructuring the borrower's operations and repayment schedule. (Peter 1999, 243) there are useful warning signals of weak loans and poor bank lending policies. The signals of weak loans include irregular or delinquent loan repayment, frequent request for alternation in loan, rising debt to net worth and not filing documents like financial statements. In addition, requests for reappraisal of assets to increase net worth and applying for loans on poorquality collateral signal problem loans. The customer may also rely on non-recurring sources of funds, such as selling of buildings and equipment to meet loan repayments. On the other hand, poor selection of risks among borrowing customers, ending money on contingent future events, lending money because a customer promises a large deposit, failure to specify a plan for liquidation of each loan are indicators of poor lending policies. In addition to this, substantial loans to insiders including employees, directors, or shareholders, tendency to overreact to competition, like making poor loans to keep customers from going to other banks is dangerous attitude. Lending money to support speculative purchases and lack of sensitivity to conditions are also good indicators of inadequate or poor bank lending policies (Koch and Timothy, 1995, 157-58).Lending difficulties can be reduced if management establishes and adheres to loan policy guidelines that restrict unacceptable activity. Such guidelines specify quantitative goals for loan production versus loan quality, and indicate procedures to attain these goals. The procedures document format for obtaining loan application, grading loans, approving loans and systematically reviewing loan performance and quality. Once the bank comes to the realization of a problem loan on its books, the first thing it should do is to contact the debtor. This helps to assess the attitude of the borrower and to find

solutions to the problem. If the bank expects a debtor's co-operation, it is usually necessary to give him assurance that the bank wishes to co-operate with him and that is advantageous to both the bank and the debtor. At this time the bank must be taken actions immediately. But it must also be reasonable and conciliatory enough that the debtor will believe that all is not lost, and that co-operating with the bank in instituting plan for correction may be beneficial to him. In this case the bank's officer should make unrealistic demands for immediate payment, unless obvious fraud or gross misrepresentation exists, nor should they threaten legal action at this time. (Rose and Peter, 1999, 248-251) The second step in handling the problem loan, as describe by the same author is searching solutions. Achieving workable solution is rarely easy, and in some cases impossible. Where no workable solution can be found, the bank has no alternative but to collect the loan, either through the voluntary liquidation of assets by the debtors or by forced liquidation. The benefits that accrue to the debtor, if the plan for correction is successful are rather obvious. For the bank as well, if it can help the borrower solve his problems and become a successful businessman, it will have a loyal customer for many years to come. The bank ordinarily gains the good will of the customer, as well as the business community as a whole. Corrective actions should be sought to recover problem loans using various workout strategies. Each problem is different, and no routine is universally applicable. Some of the most common approaches to be considered include: Developing a debt structuring program, Agreeing on additional documentation, and guarantees, Calling on a guarantees, Arranging for joint partnership and capital contribution, Working with managements to define problems & potential solutions, Developing a retrenchment program with closely monitored budgets, Arranging the sale of the operating company to a third party, and Replacing management When all the above methods fail to be effective in the recovery process, the bank has no option but to forego the dues by writing them off. Write-off should, however, be permitted as the last resort after exhausting all other opportunities. As a solution, the creditor may seek to solve the borrower's problem of inadequate cash flow to meet loan obligations through the extension of loan terms. Extensions and renewals however, should be considered only after a thorough examination of a cash flow projection, and only if there is adequate evidence that repayment will actually materialize at a later time. Any renewals should be for a short period of time, and the bank should carefully re-examine its position before granting additional renewals or extension. There are

several dangers involved in the granting of an extension. The debtor may feel relieved of pressure from, and may reduce his efforts to repay the debt, or divert available cash to the repayment of other debts, which are more pressing. Therefore, when dealing with prospective renewal request, the lender should carefully analyse the credit in the same manner as would analyse a new application

2.2 Empirical literature

Hence, many researchers have conducted a lot of study on determinants non-performing loans (NPLs) due to its significant for the bank's failure in case the researcher starts reviewing empirical related literature from the study made across country and then single country studies. Anisa U. (2015) conducted a study on non-performing in commercial banks of Ethiopia by using balanced fixed effect panel regression on eight commercial banks. The study assesses of seven factors (four bank specific and three macroeconomic factors) affecting banks nonperforming loan were selected and analyzed, the finding showed that deposit rate, loan to deposit ratio and lending interest rate had positive and significant impact on banks nonperforming loan. According to the regression result lending interest rate is a very important determinant of nonperforming loan in Ethiopia banking industry. Cost efficiency had negative and significant impact on banks nonperforming loan. Bank solvency ratio and gross national product (GDP) growth rate and inflation rate had negative and statistically insignificant impact on banks nonperforming loan.

Gadise G. (2014) studied on determinants of nonperforming loan in case of commercial banks in Ethiopia, study was conducted to examine both bank specific and macroeconomic determinants of nonperforming loan. The finding revealed that inflation rate had negative, but insignificant effect on nonperforming loan. However, bank capital adequacy ratio and lending rate had negative and statistically significant effect. Skarica(2013) also conducted a study on the determinants of NPLs in central and eastern European countries. In the study, fixed effect model and seven central and eastern European countries for 2007-2012 periods was used. The study utilized loan growth, real Gdp growth rate, market interest rate , unemployment rate has statistically significant negative association with NPLs with justification of rising recession and failing during expansion and growth has an impact on the levels of NPLs. this show as economic developments have a strong impact on the financial stability. The finding also reveals as inflation

has positive impact with justification as inflation might affect borrower's debt servicing capacities.

According to Alton and Hazen (2001) non-performing loans are those loans which are ninety days or more past due or no longer accruing interest. Hennie (2003) agrees arguing that non-performing loans are those loans which are not generating income. This is further supported by Caprio and Klingebiel (1996), cited in Fofack (2005), who define non-performing loans as those loans which for a relatively long period of time do not generate income that is, the principal and or interest on these loans have been left unpaid for at least ninety days. Non-performing loans are also commonly described as loans in arrears for at least ninety days (Guy, 2011). Therefore in this study, non-performing loans are loans that are ninety or more days delinquent in payments of interest and/or principal (Bexley and Nenninger, 2012).

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

Makri et al.(2014) identify the factors affecting NPLs of Euro zone's banking systems for 2000-2008 periods before the beginning of the recession exclusively pre-crisis period. The study includes 14 countries as a sample out of 17 total Euro zone countries. The variables included were growth rate of GDP, budget deficit (FISCAL), public debt, unemployment, loans to deposits ratio, return on assets, and return on equity and capital adequacy ratio. The study utilized difference Generalized Method of the Moments (GMM) estimation and found as real GDP growth rate, ROA and ROE had negative whereas lending, unemployment and inflation rate had positive significant effect on NPLs. However, ROA & loan to deposit ratio, inflation, and budget deficit did not show any significant impact on NPL ratio. Similarly, Carlos (2012)on macroeconomic determinants of the Non-Performing Loans in Spain and Italy found as inflation rate has insignificant effect on NPLs.(cited in GadiseGezu, 2014).

Regarding Louziset al. (2010)in the Greek banking sector, they use the method of dynamic panel data to examine the determinants of NPL for each category of loan. A set of basic macroeconomic indicators, namely, the real rate of GDP growth, the unemployment rate and the real interest rate for each loan type are studied. They used data set of new large Greek banks for the period 2003 to 2009.The results show that impaired loans is related to the macroeconomic variables(GDP, unemployment rate, the interest rate) and to the quality of management. The NPL on mortgages are less sensitive to macroeconomic conditions. This result is consistent with that found by Espinosa and Prasad (2010). Indeed, for a sample of 80 banks in the Gulf Cooperation Council(GCC) countries in 1995 to 2008, they found that the NPL ratio arise when economic growth becomes lower, the interest rate and risk aversion increase. Their model implies that the cumulative effect of macroeconomic shocks over a period of three years is indeed important.

Farhan et al. (2012) examined the perception of Pakistani bankers regarding the economic factors causing non-performing loans in the Pakistani banking sector since 2006. The study sample included the Top 10 Pakistani banks, where a questionnaire was distributed over 201 bankers who are involved in the lending decisions or analyze the credit risk or handling non-performing loans portfolio. Correlation and regression analysis was carried out to analyze the impact of selected independent variables (Interest Rate, Energy Crisis, Unemployment, Inflation, GDP Growth, and Exchange Rate) on the non-performing loans of Pakistani banking sector. The study found that Interest Rate, Energy Crisis, Unemployment, Inflation, and Exchange Rate has a significant positive relationship with the non-performing loans of Pakistani banking sector while GDP growth has significant negative relationship with the non-performing loans of Pakistani banking sector.

Salas and Saurian (2002) find a negative relation between bank size and NPLs and argue that bigger size allows for more diversification opportunities. Hu et al. (2004) and Rajan and Dhal (2003) report similar empirical evidence. Another strand of literature has focused on the degree of loan concentration in various sectors, and proposes that vulnerabilities within sectors of high loan concentration tend to exacerbate the non performing ratio (Herring and Wachter, 1999 as cited in Guy, 2011). However, Stiroh (2004) does not find evidence of benefits from diversification in the form of reduced risk, for the US banking system, since non-interest income growth was highly correlated with net interest income during the 1990s.

Bloem and Gorter (2001) agreed that "bad loans" may considerably rise due to abrupt changes in interest rates. They discussed various international standards and practices on recognizing, valuing and subsequent treatment of NPLs to address the issue from view point of controlling, management and reduction measures. A study conducted by Espinoza and Prasad (2010) focused on macroeconomic and bank specific factors influencing NPLs and their effects in the Banking System. After a comprehensive analysis, they found that higher interest rates increase NPLs but the relationship was not statistically significant.

Breuer (2006), using Bank scope data, analysed the impact of legal, political, sociological, economic, and banking institutions on problem bank loans. Nevertheless, her study suffers from a representativeness bias due to the fact that Bank scope data on NPLs are only available for a very limited number of countries and for a few numbers of banks. Other studies focusing on the macroeconomic determinants of NPLs include that of Cifter et al. (2009), Nkusu (2011) and Segovia no et al. (2006).

Lawrence (1995) examines the theoretical literature of life-cycle consumption model and introduces explicitly the probability of default. This model implies that borrowers with low incomes have higher rates of default due to increased risk of facing unemployment and being unable to settle their obligation. Additionally, in equilibrium, banks charge higher interest rates to riskier clients. Rinaldi and Sanchis-Arellano (2006) extend Lawrence's model by assuming that agents borrow in order to invest in real or financial assets. They argue that the probability of default depends on current income and the unemployment rate, which is linked to the uncertainty regarding future income and the lending rates.

Babihuga (2007), in an IMF working paper, explores the relationship between several macroeconomic variables and financial soundness indicators (capital adequacy, profitability, and asset quality) based on country aggregate data. She explained the cross-country heterogeneity by differences in interest rates, inflation, and other macroeconomic factors. However, the study does not consider the impact of industry specific drivers of problem loans.

Jimenez and Saurina (2005) examine the Spanish banking sector from 1984 to 2003; they provide evidence that NPLs are determined by GDP growth, high real interest rates and lenient credit terms. This study attributes the latter to disaster myopia, herd behaviour and agency problems that may entice bank managers to lend excessively during boom periods. Meanwhile,

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

There has not been much research which is conducted to date on the on the issue with emerging economy like Ethiopia except the study made by Wondimagegnehu (2012) specific factors on banks system in OLS model ignored macro-economic factors they focus on specific factors and Shinjergji (2013) impact of bank in OLS model there might be omission of variable bias. these study have methodological issue and ignored macro-economic factors.

2.3 Conceptual Frame work of the study

The main objective of this study is to examine the determinants on NPLs of commercial banks in Ethiopia. Based on the objective of the study, the following conceptual model is framed. As previously discussed in the related literature review parts, nonperforming loans are affected by both bank specific and macroeconomic factors. Bank specific factors are profitability, capital adequacy ratio, liquidity, diversification bank size, poor credit assessment, failed loan monitoring, underdeveloped credit culture, lenient credit terms and conditions, aggressive lending, compromised integrity, weak institutional capacity, unfair competition among banks, wilful defaults by borrower and their knowledge limitation, and overdue financing deposit rate, and capital structure; whereas macroeconomic factors are interest/lending rate, inflation rate, public debt, exchange rate, money supply (Farhanetal.(2012),Shingjergji(2013),Sakiru et al.(2011), Ahmed &Bashir (2013), Sabaetal.(2012), Louzis et al.(2010),Shingjergji(2013), Swamy (2012), Badir&Yasmin (2013), Ranjan&Chandra(2003) and Wondimagegnehu,(2012). Thus, the following conceptual model is framed to summarize the main focus and scope of this study in terms of variables included.

Independent variables **Dependent variable**

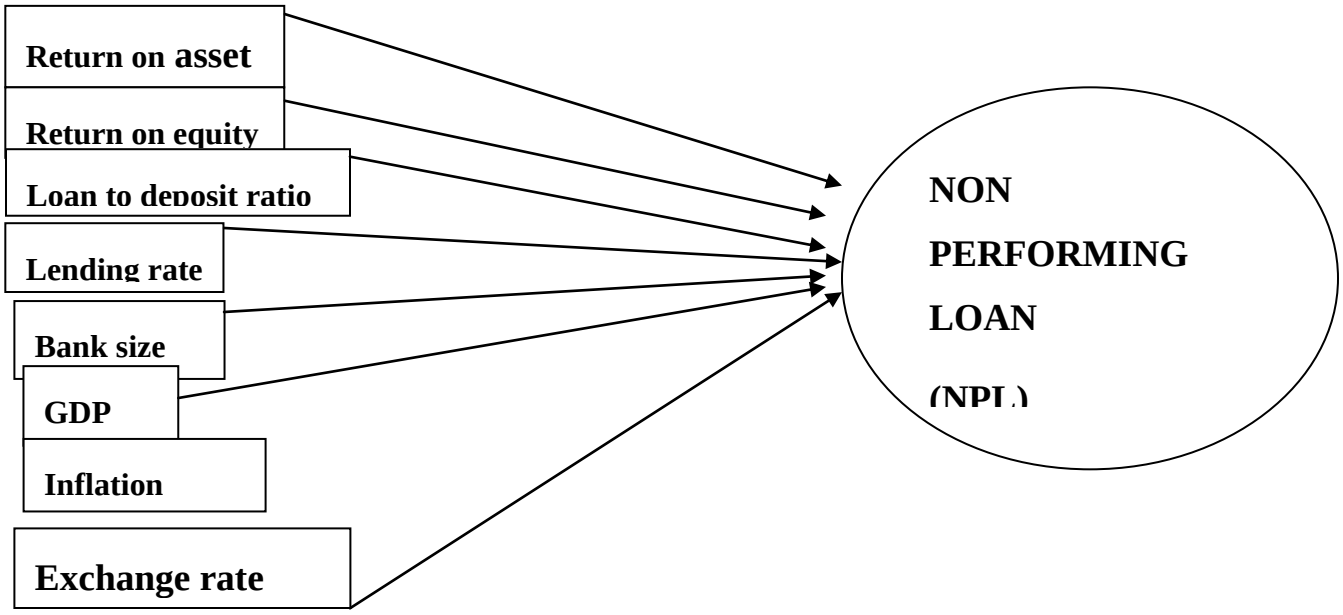

Figure 2-1 conceptual frame work

CHAPTER THREE

3 METHODOLOGY

This section presents the methodology part of the research. It includes the research design, data type, data source, sample design, data analysis technique and model specification. Research Methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically (Kothari, 2004).

3.1 Target Population

In this study, the unit of the analysis was commercial banks having at least ten years' experience which include 9 commercial banks namely ;Dashen Bank S.C (DB), Awash International Bank S.C (AIB), Abyssinia Bank S.C (AB), Wegagen Bank S.C (WB), Cooperative Bank of Oromia S.C (CBO), Nibe International Bank (NIB), Oromia International Bank (OIB), Bunna International Bank S.C (BIB) , Commercial Bank of Ethiopia (CBE). The following table 3.1 shows the name of the bank and the years they operate in the market.

3.2 Data type and Source

The bank specifically was obtained from the country's central bank, national bank of Ethiopia, which regulates the banking sector of the country and the head office of each selected commercial bank. The data obtained was secondary data. It is of panel data type which compromise the aforementioned9 commercial banks' annual accounting report for the year 2010-2018. In addition to the aforementioned panel data sources this study has also make use of different literature like books, guidelines and standards, and central bank and government reports to support and triangulate the secondary.

3.3 Definition and measurement of independent variables

This section explains the variables used as independent (explanatory) variables in this study. The definitions/measurements used for these variables are described and summarized under the following table.

1, ROA expresses a relationship between the net profit after taxes of the bank and its net assets like the profitability ratios, the higher the ROA the better. A low level of ROA may be the result of a low level of profit margin or low turnover of total assets and it indicates the ability of bank management to generate profits by utilizing the available assets of the bank. ROA gives an idea

as to how efficient management is at using its assets to generate earnings and represents efficiency in asset utilization; poor utilization of assets leads to higher NPLs for the banks. Thus, this ratio is expected to have negative relationships with NPLs in this study. It is measured by the ratio of net profit to total asset.

ROA = Net profit / Total asset

2, ROE measures a bank's ability to reward its shareholder's investment, build its equity base through retained earnings and raise additional equity investment. This ratio demonstrates the banks' ability to generate income from its core financial services activity. Represents rate of return received from equity invested in banks this ratio is expected to have negative relationships with NPLs. It is measured by the ratio of net profit to total equity,

ROA=Net profit / total equity

3, Loan to deposit (LTD) ratio examines bank liquidity by measuring the funds that a bank has utilized into loans from the collected deposits. It demonstrates the association between loans and deposits. Besides, it provides a measure of income sources and also measures of the liquidity of bank assets tied to loan (Makir et al. 2014) also represents a banks preference for credit. It is credit culture that represents a bank's preference for credit. It is credit culture that represents a bank's preference for credit. It is measured in terms of loan to deposit ratio, this ratio is expected to have positive relation with NPLs

LTD= Total credit / Deposit

4, Lending rate lending interest rate has an inherent implicit cost on the credit issued by banks with implication on loan defaults. In this regard, high levels of nonperforming loans (NPLs) will depress economic growth owing to many banks refusing to lend. The effect can be either good or bad. It can be good in the sense that interest rate repayments enhance and increases commercial banks profitability. However, it can be bad if the borrowers cannot make interest repayments as well as the principal amount which eventually results in defaulting or nonperforming assets, "Non-performing loans (NPLs) are those loans which are ninety days or more past due or no longer accruing interest (Joseph, Edson, Manuere, Clifford and Michael 20012).

5, Exchange rate the rate at which one currency will be exchanged for another, it also regarded as the value of one country's currency in relation to another currency there are different factors

affecting the change of exchange rate this are;- Balance of payment, interest rate level, inflation factor, fiscal and monetary policy, venture capital, government market intervention, and economic strength of a country. Exchange rate will change whenever the values of either of the two component currencies change. Increased demand for a currency can be due to either an increased transaction demand for money or an increased speculative.

6, Growth of domestic product is the total value of every produced in the country. It doesn't matter if It's produced by citizens or foreigners. If they are located within the country's boundaries, their production is included in GDP. The components of GDP included personal consumption expenditures plus government spending plus (exports minus imports). There are many different ways to measure a country GDP. Nominal GDP is the raw measurement that includes price increases, Real GDP calculates by using a price deflator.it tells you how much prices have changed since a base year. Growth rate is the percentage increase in GDP from quarter to quarter. GDP per capital is the best way to compare gross domestic product between countries it takes out the effect of inflation, exchange rates, and difference in population. GDP impacts personal finance, investments, and job growth rate financial institution.

7, Inflation rate; is a sustained increase in the general price level of goods and services in an economy over a period of time. When the general price level rises, each unit of currency buys fewer goods and services. Measure of inflation is the inflation rate, the annualized percentage change in a general price index, usually the consumer price index, over time. Very high rate of inflation and hyperinflation are caused by an excessive growth of money supply the consensus view is that a long sustained period of inflation is caused by money supply growing faster than the rate of economic growth.

8, BANK SIZE this represents the ownership of assets by banks, high asset ownership enables banks to offer more financial services at low cost.

3.4 Econometric specification

In panel data analysis, OLS, Fixed effect (FEM) and random effect model (REM) are most popularly used in the empirical studyThus, In order to make use of their advantages, the all of these model were employed in this study. This is because these models have their own assumption and they may or may not consistence and efficient estimators for certain circumstance. Therefore, it is important to understand their assumptionsand implications. This is

due to the interpretation of the result in this thesis will be well understood if the assumption of the model employed is known. Accordingly, in the following section, assumptionsand implications of specified equation in each model will be presented.

3.4.1 Pooled OLS model

Pooled OLS model assume that the intercept and coefficient value is the same across and within manufacturing industry, But the most critical assumption of OLS is that ‘‘**theexogeneity assumption’’** $E(\varepsilon\_i/x\_i) = 0$ i.e., the error term and the regress must be statistically independent. More specifically, the **exogeneity assumption** implies that **the distribution of error** iszero ‘$E(\varepsilon_{it}) = 0$’ andthe error term does not **correlate** with regress ‘$E(\varepsilon\_i/x\_i) = 0$’. In simple term Pooled OLS model assumes that bank specific unobservable factors are equally distributed (homogeneity assumption) and they do not influence NPL of banks over time. Accordingly, the researcher starts with simple assumption of pooled OLS that there is no cross sectional and temporal effect. More specifically, that there is no banks specific unobservable factors that affect NPL of banks over time (they are uncorrelated) and NPL of banks in the previous years didn’t affect NPL of banks in the current years. Based on this assumption, various variants of equation (1) will be specified as follows:

$$inNPL_{it} = \beta + \beta_1 InROA_{it} + \beta_2 InROE_{it} + \beta_3 DR_{it} + \beta_4 LR_{it} + \beta_5 EXR_t + \beta_6 GDP_t + \beta_7 Inf_t + \beta_8 inSize_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots (1)$$

Where, ‘inNPL_{it}’: stands for value of non-performing loan of i bank at time ‘t’, in log form;

InROA_{it} : is return on asset of bank iat time ‘t’. It is as measured ratio of net profit to net asset;

InROE_{t} : is return on equity of bank iat time ‘t’. It is as measured ratio of net profit to total equity;

DR_{it} : stands for deposit rate of bank iat time ‘t’. It is measured as ratio of total credit to deposit;

LR_{it} : stands for lending rate of bank iat time ‘t’. It is measured as amount fixed by central bank of Ethiopia;

EXR_{t}: stands for exchange at time ‘t’. It is measured based on amount fixed by central bank of Ethiopia;

GDP_{t}: stands for value of GDP of the country at time ‘t’;

Inf_{t}: stands for inflation rate in the country at time ‘t’;

$Size_{it}$: stands for log of size of bank iat time 't'. It is measured as a value of total assets owned by bank i;

β: is constant term in the model; andε_{it}: is idiosyncratic error term assumed to be exogenous 'E$(u_{it}) = 0$', and uncorrelated with regress 'E$(u_i/x_i) = 0$'.

Pooled OLS results in the above equation (1) ignored the time and individual effect on bank output. However, there are unobservable factor not known to econometrician but known to bank such as management performance of bank that might affect the productivity of banks; or output of banks may change over time due to economic shock in the country. Similarly, regional unobservable variations such as infrastructure and technological opportunity in a given region; and political stability in a given region are also of such factors that might account for variation in the NPL of banks. Hence, ignoring such factors will make the OLS estimates to be suffered from omission of variable bias.As remedies for such problem econometricians have proposed the usage of FEM.

3.4.2 Fixed effect model FEM

The omission of variable bias in OLS model might found in error term ''ε_{it}'', which might happen to be correlate with predictors resulting assumption of exogeneity not be hold $E(\varepsilon_{it}) \neq 0$'. Under fixed effect, the error is decomposed to $\varepsilon_{it} = a_i + u_{it}$ where, idiosyncratic error, u_{it} assumed to be exogenous '$E(u_{it}) = 0$', and uncorrelated with regress '$E(u\_i/x\_i) = 0$'.The error term '$a_i{}'$ is an unobservable fixed banks specific and regional fixed effect. Thus, FEM relax exogeneity assumption in OLS and allow a_i to be endogenous$(a_i) \neq 0$and correlate with regress'$E(a\_i/x\_i) = 0$',Thus, using FE model will removes the effect of those time-invariant characteristics. So the researcher cans analyse the net impact of variables that vary over time in FE model. Accordingly, assuming that something unobservable specific to banks and something specific to region where bank operate influence NPL of banks, the following equation was specified.

$$NPL_{it} = \beta + \beta_1 ROA_{it} + \beta_2 ROE_t + \beta_3 DR_t + \beta_4 LR_{it} + \beta_5 EXR_{it} + \beta_6 lnGDP_t + \beta_7 lnSize_t + \beta_8 Inf_t + +\alpha_{it} + u_{it} \quad \ldots\ldots\ldots\ldots (2)$$

Further, in order to see hoe the effect of the independent variables varies over time , defenced fixed effect model were used., differenced model will wipe the unobservable bank specific factors Along with flexibility to adjust for time. Accordingly, the following equation specified.

$$\text{Dt}(NPL_{it}) = \text{Dt}(\beta + \beta_1 ROA_{it} + \beta_2 ROE_t + \beta_3 DR_t + \beta_4 LR_{it} + \beta_5 EXR_{it} + \beta_6 lnGDP_t + \beta_7 lnSize_t + \beta_8 Inf_t + +\alpha_{it} + u_{it}) \quad \ldots\ldots\ldots\ldots (3)$$

Where, Dt is differenced time for a given years.

However, FEM cannot control factors that don't vary over time within banks such as education, race, and age and so on. For instance certain age group of employee might impact in same way NPL of banks. In this case the remedy is the usage of REM.

3.4.3 Random effect model REM

REM has more strict assumption of homogeneity but can control omission of variable bias as well as well as factors that doesn't varies over time across Banks. REM can measures the between and the overall variation across banks. It measures the difference between the averages NPL at bank i and the average NPL in the entire commercial banks. REM also decomposes the error term ε_{it} in to two;$r_{it} + u_{it} = \varepsilon_{it}$where,$r_{it}$ is banks specific random unobservable factors that could correlate with dependent and independent variables. However, REM requires both banks specific fixed unobservable factors and the idiosyncratic error term u_{it} to be uncorrelated with regress. Accordingly, assuming that something random bank specific effectinfluence NPL of banks, the following equation was specified

$$NPL_{it} = \beta + \beta_1 InROA_{it} + \beta_2 InROE_t + \beta_3 DR_t + \beta_4 LR_{it} + \beta_5 EXR_{it} + \beta_6 GDP_t + \beta_7 Size_t + \beta_8 Inf_t + +r_{it} + u_{it} \quad \ldots\ldots\ldots\ldots (4)$$

3.5 Methodology of data analysis and procedures

Regarding methodology of data analysis, there are three type of data analysis that has been employed across empirical literatures. These includes: Single Cross-Sectional data, time series data and panel data analysis. Single Cross-Sectional Data analysis may reflect inter-individual differences. However, it doesn't capture change over time and hardly allow the possibility to specify more complicated hypotheses. Whereas, Time Series data analysis allows analysing the trend over time for a variable in question, data may suffer from multi collinearity and shortages of degree of freedom. Most importantly, it doesn't reflect inter-individual differences (Colin

Cameron and Pravin Trivedi, 2009). To this regard, the most powerful data analysis method is the use of Panel data. By blending inter-individual indifference with intra-individual dynamics, it can allow researchers the possibility to specify more complicated hypotheses than a single cross-sectional data or time series data. Further the researcher can enjoy more degree of freedom, more sample variability and less multi collinearity. As Wooldridge (2002, p. 406) Stated, in quote, ‘‘in fact, data with cross-sectional and time series aspects can often shed light on important policy questions’’. In this thesis, therefore, method of panel data analysis was employed. Accordingly, different panel data procedures were used to avert estimation problems that may otherwise generate biased and inefficient estimates. In general, the data analysis procedures in this study duel in two main issue of panel data analysis.

I. Data clearing

some tests and examinations was conducted to assure the validity of the original data. The data was cleaned via extensive checks for nonsense observations, coding mistakes, and outliers.

II. Model miss specification

Different pool-ability test was conducted to address miss specification of variables in the model. In addition to this, other issue that resulted in model miss-specification in panel data analysis is that of hetrosecidacity (non-constant variance) and auto correlation problem. For instance , pooled OLS model usually shows false SD in panel data, because of OLS assumption that idiosyncratic and individual effect are normally distributed (homogeneity assumption), so there might be hetrosecidacity implying the usual hypothesis testing routine is not reliable as t-test, z-test and Wald-test are not valid any more. A simple method to notice this problem is to use OLS robust (i.e. the variance covariance matrix of beta-hat in the presence of hetrosecidacity and comparing the standard error of OLS estimation. if OLS standard errors coefficients are differing across, it imply the presence of $heteroskedastic$. if this is the case, the issue of hetrosecidacity will be addressed by using standard error. In addition to controlling hetrosecidacity, usage of robust standard error will address problem of autocorrelation.

3.6 The Research Hypothesis and Expected result

The following table depicted the research Hypothesis and Expected result.

Table 3-1Hypothesis and Expected result

Hypothesis	Expected result
H1: There is significance r/n ship b/n return on asset and nonperforming loan	-
H2: There is significance r/n ship b/n return on equity and nonperforming loan	-
H3: There is significance r/n ship b/n loan to deposit ratio and nonperforming loan	+
H4: There is significance r/n ship b/n lending rate and nonperforming loan	
H5: There is significant r/n ship b/n exchange rate and nonperforming loan	-
H6: There is significant r/n ship b/n Gdp and nonperforming loan	+
H7: There is significant r/n ship b/n inflation rate and nonperforming loan	
H8: There is significant r/n ship b/n bank size and nonperforming loan	

CHAPTER FOUR

4 DATA CLEARING, DATA ANALYSIS AND RESULTS

4.1 Data Clearing

Prior to the formal analysis, some tests and examinations were conducted to assure the validity of the data set in the original data obtained. With help of STATA 14.2, the data were cleaned extensively for nonsense observations, coding mistakes, missing data item, outliers and the like. The researcher found no nonsense observations and coding mistakes in the data obtained. However, the data had some problematic issues that should be considered for the final data set used in the estimation. These are entry and exit of target group (Ethiopian commercial banks), missing data and outliers. Accordingly, the researcher took some measures. Each observed problems and measure taken were discussed in the following section.

4.2 Issue of Entry and exist, missing data items and outliers

One of an important problem the researcher faced was related to entry and exists of commercial banks. Due to this, the number of banks in operation is changing over time. The researcher managed this problem through banks' identifiers (id). For example, banks identification numbers are supposed to die with the banks, so the researcher deleted any observations where banks identifiers returned after dropping out of the entire data set. Best example is Debub banks.

Further, another measure taken to the data set is related to missing observation data items. For instance, Banks with missing important observation item such as amount of NPL, ROA and ROE and so on were dropped from the data set when the missing is not random. For instance, for Enat bank and Lion banks, there are no observations for all item in all years. With regard to missing data item that are random, the research leave them as it is. Thanks to STATA, it threats them as a missing observation by default. For issues related to outliers, the researcher employed regression and checked if there are outliers beyond acceptable threshold within sample frame. In econometrics, maximum of 2 observations per sample size that are greater than 2*sqrt ((e (df_m) +1)/e (N)), is tolerable. STATA do this easily by the command "dfit" see for detail Colin Cameron and PravinTrivedi (2009). The threshold for the current data set was (.283) and only one observation was detected that was greater than 2 times the threshold limit. Hence, the researcher leaves it as it is as they will not affect the outcome of the estimation in the model.

4.3 Data analysis

4.3.1 Description of the Final Panel Data Set

To this end, after all the aforementioned data specification the data set produced balanced panel of (9) individual banks with (81) observation item over eight years (2010-2018). Detail of the final panel data set was presented in the following section. Table (4.1) bellow depicts summary statics for within and between variables in the final panel data set.

Table 4-4-1: Summery of statics

Variable		Mean	Std. Dev.	Min	Max	Observations	
id	overall	5	2.598076	1	9	N =	81
	between		2.738613	1	9	n =	9
	within		0	5	5	T =	9
year	overall	2014	2.598076	2010	2018	N =	81
	between		0	2014	2014	n =	9
	within		2.598076	2010	2018	T =	9
npl	overall	4.976912	4.863978	.1074	28.43	N =	81
	between		3.496041	.1474111	11.13778	n =	9
	within		3.557838	-3.560866	22.26913	T =	9
roa	overall	.1169086	.115247	.0155	.481	N =	81
	between		.0858423	.0288889	.2592667	n =	9
	within		.0815466	-.0435247	.4967753	T =	9
roe	overall	.1431237	.2562013	.0071	2.3753	N =	81
	between		.0949957	.0354889	.3711222	n =	9
	within		.2398278	-.1216985	2.147301	T =	9
ldr	overall	1.117857	.816116	.0018	4.0615	N =	81
	between		.3375583	.6985333	1.6485	n =	9
	within		.7506626	-.4622759	3.549224	T =	9
lr	overall	12.84944	2.040682	11.875	18.5	N =	81
	between		0	12.84944	12.84944	n =	9
	within		2.040682	11.875	18.5	T =	9
inf	overall	13.43844	8.62804	7.3	33.232	N =	81
	between		0	13.43844	13.43844	n =	9
	within		8.62804	7.3	33.232	T =	9
gdp	overall	9.902333	1.059019	8	11.386	N =	81
	between		0	9.902333	9.902333	n =	9
	within		1.059019	8	11.386	T =	9
exr	overall	19.41932	3.960989	12.8909	27.6269	N =	81
	between		0	19.41932	19.41932	n =	9
	within		3.960989	12.8909	27.6269	T =	9
bsize	overall	9.830205	1.167537	6.17	15.259	N =	81
	between		.4076121	9.371556	10.55109	n =	9
	within		1.10164	6.628649	14.8012	T =	9

The above table showed individual sector-year pair observations and the within and between variation for the variables in the data set. The within variation for individual id (Banks) is ‘’ 0’’

that means they are individual time-invariant. Further, the between variation for year also indicated "0" implying that all individual-year pair observations are the same for all year. The column min-max shows minimum and maximum variation of x_{it} for overall $\&hat{x}_i$, for between and $hat\,x_i - hatxi - hatx$ for within variation. It has been indicated that when the between variation is higher than the within one random effect model (REM) is mostly appropriate. If the case is in the otherwise, fixed effect model is appropriate (FEM). Figure 4-1 and 4- 2 bellow depicts heterogeneity of NPL distributions across banks and across years respectively. It revealed considerable variation among banks across year.

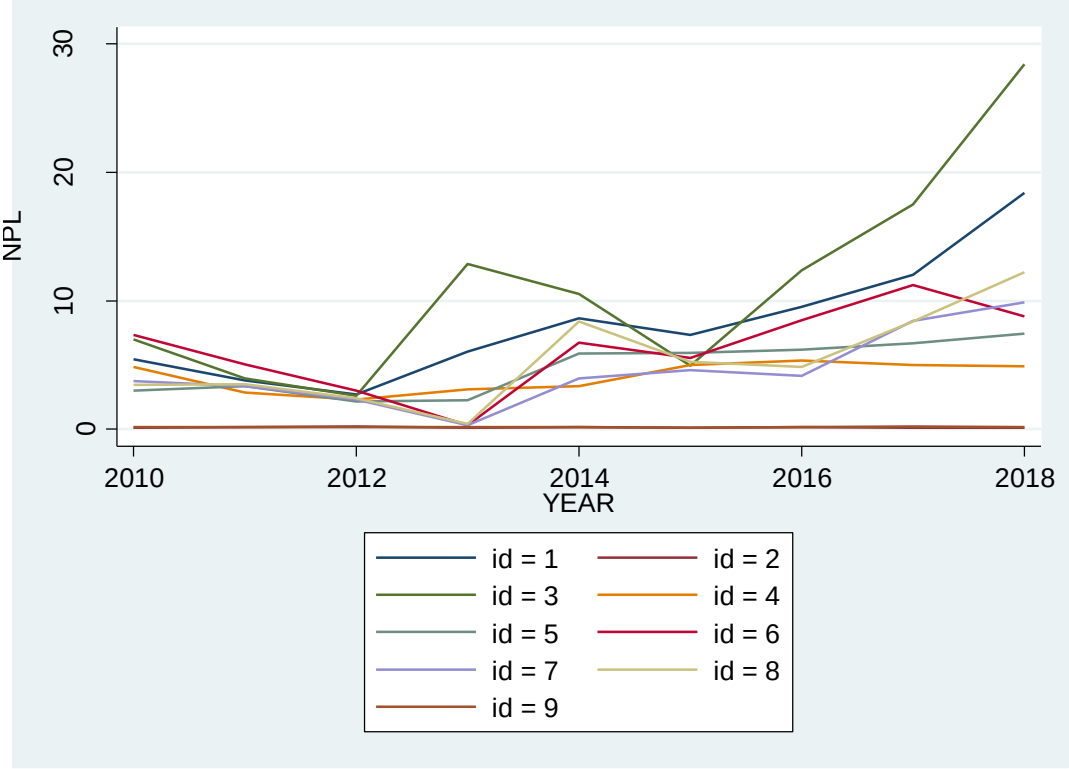

Figure 4 -1: Distribution of NPL across Banks

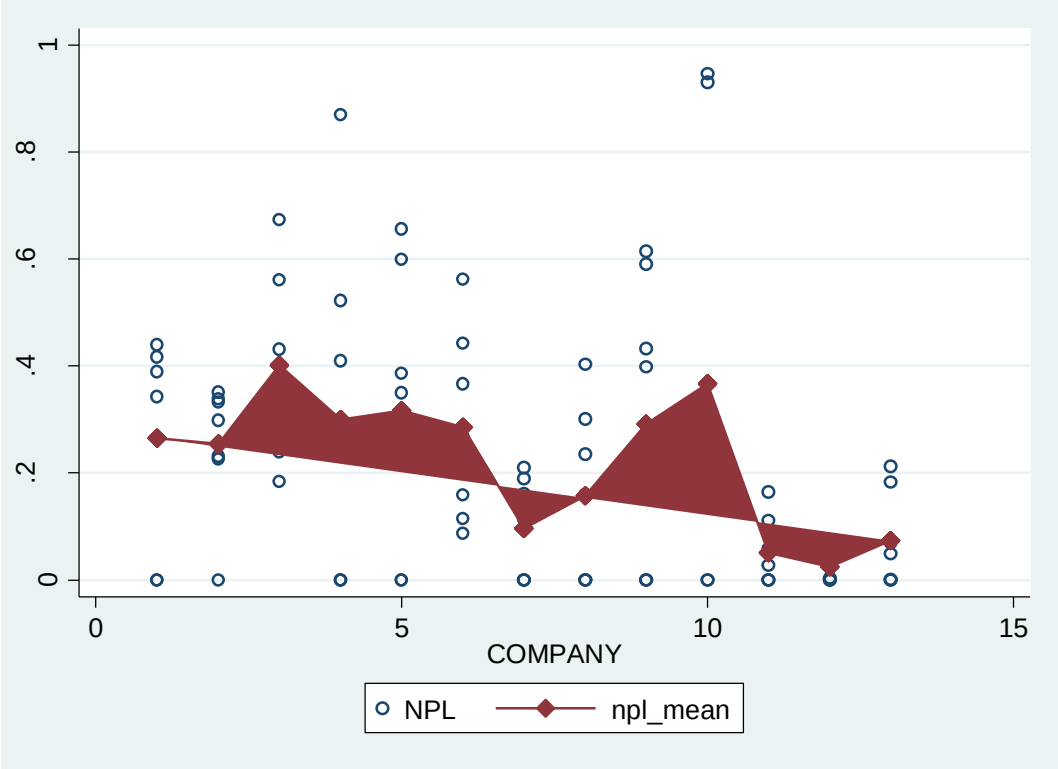

Figure4- 2hetrogenity across Banks

4.3.2 Controlling for Heteroskedasticity and Autocorrelation

In this study, the researcher has employed pooled OLS and Fixed effect Model. However, there is suggestion by econometrician that panel data analysis often suffer from *hetrocedacity* and autocorrelation. Various econometricians like Wooldridge (2004); Colin (2009) and Williams (2015) indicated that pooled OLS usually showed false standard errors in panel data estimation. This is happened when OLS assumption that the variance of the error term is constant i.e. Homoscedastic is violated. If the error terms do not have constant variance, they are said to be heteroskedasticity. If this is the case, therefore, OLS no longer become efficient and leading to wrong interpretation of the estimated result. Accordingly, the researcher investigated existence of heteroskedasticity in pooled OLS model regression output using the Breusch-Pagan/Cook-Weisberg tests. This test is designed to detect any linear form of heteroskedasticity. In STATA this is accomplished with hettest command befor regression.

The test for heteroskedasticity revealed that the presence of heteroskedasticity in pooled OLS estimation. In the Breusch-Pagan test, the null hypothesis that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more

variables. The alternative hypothesis states that the error variances increase (or decrease) as the predicted values of NPL increase, e.g. the bigger the predicted value of NPL, the bigger the error variance is. A large chi-square indicates that heteroskedasticity was present.

Therefore, now the question is how one can deal with panel data in the presence of heteroskedasticity in this case? According to Wooldridge (2004, pp. 275-276), "the robust variance matrix estimator is valid in the presence of any heteroskedasticity or serial correlation in the idiosyncratic errors $\{u_{it}: t = 1 \ldots T\}$, provided that T is small relative to N". Thus, this clustering method using the robust variance matrix is a valid approach to addressing heteroskedasticity and serial correlation. Hence, using robust OLS make the model efficient. In this thesis, the researcher account for it employed robust variance matrix in the model to control for heteroskedasticity and autocorrelation.

4.4 Result

Estimation was conducted on all on 9 selected banks that have full observation within the data sets' time frame. The regression results for different model specifications on nine selected commercial Banks are presented but concluded in fixed effect model. As it can be seen in the table 4-2 below, regression result in the pooled OLS estimation; the effect of return on asset on the non-performing loan is negative and statistically significant at 1 percent significance level. However, the effect of return on equity on the non-performing loan is positive and statistically significant at 1 percent significance level. On other the estimation with pool OLS reveals that a positive relationship between NPL and GDP at 5 percent significant level. Similarly, the table revealed a positive but slightly significant relationship between lending rate and NPL at 10 percent but not at 5 or 1 percentage significant level. However, pooled OLS estimator ignores the time and bank specific factors which lead to omission of variable bias in pooled OLS estimator. In order to control for this, the researcher employed fixed effect model. FE model will removes the effect of time-invariant characteristics.Shinjergji(2013) who conducted study on'' the impact of bank specific factors on NPL in Albania banks systems" utilized OLS estimation model and found as ROE have significant negative on NPL.

Table 4-2 pooled OLS regression result

Npl	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Roa	-14.756	3.398	-4.34	0	-21.53	-7.983	***
Roe	3.305	1.159	2.85	.006	.995	5.614	***
Lr	.904	.495	1.83	.072	-.083	1.891	*
Ldr	1.786	.718	2.49	.015	.354	3.218	**
Exr	.199	.153	1.30	.197	-.106	.504	
Gdp	.814	.348	2.34	.022	.119	1.508	**
Inf	-.051	.031	-1.63	.108	-.113	.011	
Bsize	-1.132	.803	-1.41	.163	-2.732	.468	
Constant	-7.501	9.969	-0.75	.454	-27.374	12.373	

Mean dependent var	4.977	SD dependent var	4.864
R-squared	0.430	Number of obs	81
F-test	7.830	Prob> F	0.000
Akaike crit. (AIC)	457.643	Bayesian crit. (BIC)	479.193

Note: *robust standard error to control heterocedssity and autocorrelation; *** p<.01, ** p<.05, * p<.1*

Therefore, the researcher can analyze the net impact of variables that vary over time. In this specification, the estimation in table 4.2 bellow revealed the estimated results considerably changed from the previous POLS model estimated result. For instance, the coefficient for exchange rate and inflation become significant association with non-performing loan. This is not surprising, as expected; the F-test in fixed effect model rejects the null of zero heterogeneity. Hence, this confirmed the existence of omission unobservable variable bias in pooled OLS estimator. As it can be seen from the table 4-3 below, unlike previous estimation in POLs the fixed effect estimates showed a negative and highly significant association of the coefficient for inflation with of non-performing loan at 1% significance level. This because inflation affects

borrowers' debt-servicing capacity through different channels and its impact on NPL can be negative. Because a higher inflation rate can affect borrowers' debt servicing easier by reducing the real value of outstanding loans; however, it can also weaken some borrowers‟ ability to service debt by reducing their real income. Thus, in fixed effect model, for the coefficient of inflation, the interpretation holds that 1 one unit increase of inflation is associated with 0.066 unit decrease in non-performing loan of banks at 1 percentage significant level. The finding of the study is consistent with the finding established by Fofack (2005), Pasha and Khemraj (2009), Louzis et al. (2010) and Azeem et al. (2012).

Table 4-3 Fixed effect base line regression results

Npl	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Roa	7.881	6.643	1.19	.269	-7.437	23.2	
Roe	-2.257	1.2	-1.88	.097	-5.025	.511	*
Ldr	.8	.72	1.11	.299	-.86	2.46	
Lr	.545	.297	1.84	.104	-.139	1.229	
Inf	-.066	.02	-3.32	.011	-.112	-.02	**
Gdp	.519	.171	3.04	.016	.126	.912	**
Exr	.197	.073	2.69	.028	.028	.366	**
Bsize	-.788	.675	-1.17	.276	-2.343	.768	
Constant	-3.855	6.179	-0.62	.55	-18.104	10.395	

Mean dependent var	4.977	SD dependent var	4.864
R-squared	0.511	Number of obs	81
F-test	6.442	Prob> F	0.009
Akaike crit. (AIC)	392.597	Bayesian crit. (BIC)	411.753

Note: *robust standard error is used to control heterocedssity and autocorrelation; *** p<.01, ** p<.05, * p<.1*

The table also revealed a highly significant but positive association of the coefficient for exchange rate with of non-performing loan at 1% significance level. Thus, the interpretation holds that 1 one unit increase in exchange rate is associated with 0.066 unit rise in non-performing loan of banks at 1 percentage significant level. The coefficient for gdp has still shown a positive and highly significant association with of non-performing loan at 1%

significance level. Similarly, the interpretation holds that 1 one unit increase in gdp is associated with 0.066 unit rise in non-performing loan of banks at 1 percentage significant level. Whereas, the significance level for the coefficient of roe have turn out to be negative and significance association with of non-performing loan but at 10% significance level. Hence, the interpretation holds that 1 one unit increase in return on equity is associated with 2.257 unit decrease in non-performing loan of banks but at 10 percentage significant level. Ali and Iva (2013) who conducted study on "the impact of bank specific factors on NPLs in Albanian banking system" considered Interest rate in total loan, credit growth, inflation rate, real exchange rate and GDP growth rate as determinant factors finding reveals a positive association of loan growth and real exchange rate.

Further, in order to see the effect of change over time, the researcher employed fixed differenced estimator. Using differenced model estimator one can wipe out fixed unobservable variables that could correlate with explanatory variable. Accordingly, the following table depicts the regression result based on these specifications.

Table 4-4 1st differenced, 2nd differenced and 3rd differenced regression result

	(1st diff)	(2nd diff)	(3rddif)
Dependent var.	Npl	Npl	Npl
Roa	-.215	-.461	-1.784
	(2.831)	(1.771)	(1.995)
Roe	-1.009*	-.779*	-.028
	(.552)	(.442)	(.566)
Ldr	.745**	.6*	.431
	(.361)	(.357)	(.307)
Lr	1.259***	3.797	10.232**
	(.432)	(2.44)	(4.248)
Inf	.024	.166	.406**
	(.062)	(.155)	(.196)
Gdp	.56***	.947*	2.158**
	(.147)	(.488)	(.931)
Exr	-1.017	-4.052	-12.635**
	(.665)	(2.932)	(5.081)
Bsize	-.29	-.179	-.07
	(.225)	(.153)	(.254)

_cons	1.72*	-.797	1.698
	(.956)	(.855)	(1.338)
Observations	72	63	54
R-squared	.224	.154	.218
F	8.83	0.0341	0.2183

As it can be seen from the table 4-4 above, fist differenced fixed estimators have showed a positive and highly significant association of the coefficient for both gdp and lr with non-performing loan over time at 1% significance level for each coefficient respectively. Thus, in first differenced estimation, for the coefficient of gdp, the interpretation holds that 1 one unit increase of gdp is associated with 0.56 unit rise in non-performing loan of banks over time at 1 percentage significant level. For the coefficient of lr, the interpretation holds that 1 one unit increase of lr is associated with 1.259 unit rise in non-performing loan of banks over time at 1 percentage significant level.

Similarly, the table result has showed a positive and significant association of the coefficient for lr with non-performing loan over time at 5% significance level. For the coefficient of ldr, the interpretation holds that 1 one unit increase of ldr is associated with 0.745 unit rise in non-performing loan of banks over time at 5 percentage significant level. Whereas, The coefficient for return on equity , in the first differenced model, is still negative but slightly significance at 10% significance level which is similar to that of the previous estimation in base line fixed effect model estimator. With regard to this; the interpretation holds that 1 one unit increase in return on equity is associated with 1 unit decrease in non-performing loan of banks but at 10 percentage significant level.

Moreover, in second differenced fixed model estimation in the same table above have showed a positive but slightly significant association of the coefficient for both gdp and ldr with non-performing loan over time at 10% significance level for each coefficient respectively. This indicated that the impact of gdp and lending to deposit ratio decrease over time. Whereas, The coefficient for return on equity, in the second differenced model, is still negative but slightly significance at 10% significance level which is similar to that of the previous estimation in the

first differenced estimation and base line fixed effect model estimator. With regard to this; the interpretation holds that 1 one unit increase in return on equity is associated with 0.779 unit decrease in non-performing loan of banks but at 10 percentage significant level.

However, estimation with three year differenced model reduces the degree of freedom. Hence, the result is not as powerful as first and second differenced estimation result in this case. In this three year differenced model estimation, the coefficient for lr has shown positive and significant association with non-performing loan over time at 5% significance level. Moreover, the coefficient for both gdp and inflation has shown positive and significant association with non-performing loan over time at 5% significance level for each coefficient respectively. The coefficient for exchange rate has become negative and significance association with non-performing loan at 5% significance level. The negative relationship is an implication of the debt-servicing capacity of borrowers such as import-oriented firms. ; the interpretation holds that 1 one unit increase in return on equity is associated with 12.653 unit decrease in non-performing loan of banks at 10 percentage significant level.

In this study, the final panel data estimator used is random effect model. In order to account for time variant component that might correlate with in the error term in fixed effect model, the researcher have employee random effect model. This is because fixed effect model couldn't control for time variant component. If this is the case, then FE is no suitable since inferences may not be correct and one needs to model that relationship (probably using random-effects). However, the researcher undertook Robust Housman test. The null hypothesis test is strongly rejected indicating inappropriateness of RE model (See appendix). Therefore, fixed effect estimation model was preferred over random effect in this case. However, for the sake of completeness, the random effect estimation output is presented. Table 4-5 Random effect regression results for this research is more appropriate model is fixed effect model because its more realistic and to see the effect of change over time, Using differenced model estimator one can wipe out fixed unobservable variables that could correlate with explanatory variable.

Npl	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Roa	-5.632	3.584	-1.57	.116	-12.655	1.392	
Roe	.848	.943	0.90	.369	-1.001	2.696	
Ldr	1.173	.879	1.33	.182	-.551	2.896	
Lr	.725	.297	2.44	.015	.143	1.307	**
Inf	-.06	.018	-3.32	.001	-.096	-.025	***
Gdp	.668	.241	2.77	.006	.195	1.14	***
Exr	.213	.088	2.42	.016	.04	.385	**
Bsize	-.997	.858	-1.16	.245	-2.678	.684	
Constant	-5.246	9.133	-0.57	.566	-23.145	12.654	

Mean dependent var	4.977	SD dependent var	4.864
Overall r-squared	0.384	Number of obs	81
Chi-square	93.233	Prob> chi2	0.000
R-squared within	0.452	R-squared between	0.619

*** p<.01, ** p<.05, * p<.1

As it can be seen from table 4-5 above , the estimation in random effect have shown that a negative and highly significant association of the coefficient for inflation with of non-performing loan at 1% significance level and highly significant but positive association of the coefficient for gdp with of non-performing loan at 1% significance level. The coefficient for lr have still shown a positive and significant association with of non-performing loan at 5% significance level Whereas, the significance level for the coefficient of exchange rate have turn out to be positive and significance association with of non-performing loan at 5% significance level. 4

CHAPTER FIVE

5 CONCLUSIONS, AND RECOMMENDATIONS

This chapter is the last chapter of this study; which sum up the whole thesis in a comprehensive manner. Accordingly, in the first part of this chapter, an overview of the thesis and its major findings are presented and finally, the chapter ends up with recommendations for policy implications. This research show deeply show bank specific factor and macro-economic factor variables in different model but to conclude in fixed effect model. Other researchers didn't see variation of variables in different model but these variables have different result. These research concluded.

5.1 Conclusion

In this study, the determinants of non-performing loans in Ethiopian commercial banks were investigated. In doing so, some macro-economic and bank-specific variables are included in the study as a determinant of non-performing loans. These includes, return on asset, return on equity, lending rate, loan to deposit ratio, bank size, GDP, inflation and exchange rate.

The study was conducted through panel data which covers nine years of annual observation (2010-2018) by including nine sample banks which have full observation item within the data time frame. In order to forward a reliable result, extensive data clearing were undertaken. Econometric issue that underline panel data analysis were taken, to avert that might otherwise create bias estimation result. For instance, Issue related to heteroskedasticity and auto correlation was addressed using robust stander error. The usual issue related to omission of variable bias in pooled OLS estimator were address through different model specification such fixed effect model, differenced fixed effect model and random effect model. To the researcher knowledge, there is no previous research in Ethiopia that investigates determinants of non-performing loans of commercial banks using several panel data model estimators. The robust result in all model specification revealed that a significance association of return on equity, GDP, lending rate, loan to deposit ratio, inflation and exchange rate with that of non-performing loan. More specifically,

GDP: in fixed effect estimators the interpretation holds that 1 one unit increase in on gdp is associated with 0.066 unit rise in non-performing loan of banks at 1 percentage significant level. In first differenced estimation, for the coefficient of gdp, the interpretation holds that 1 one unit

increase of gdp is associated with 0.56 unit rise in non-performing loan of banks over time at 1 percentage significant level.

second differenced fixed model estimation have showed a positive but slightly significant association of the coefficient for both gdp and ldr with non-performing loan over time at 10% significance level for each coefficient respectively. This indicated that the impact of gdp and lending to deposit ratio decrease over time.

Lending rate: in three year difference model for the coefficient of lr, the interpretation holds that 1 one unit increase of lr is associated with 1.259 unit rise in non-performing loan of banks over time at 1 percentage significant level.

Loan to deposit ratio: in fixed effect model the coefficient for ldr have positive and significance association with non-performing loan at 1 percentage significant level. Moreover, in three year difference model ldr, the interpretation holds that 1 one unit increase of ldr is associated with 0.745 unit rise in non-performing loan of banks over time at 5 percentage significant level.

Inflation: in fixed effect model, for the coefficient of inflation, the interpretation holds that 1 one unit increase of inflation is associated with 0.066 unit decrease in non-performing loan of banks at 1 percentage significant level.

Exchange rate; is associated with 0.066 unit rise in non-performing loan of banks at 1 percentage significant level.

5.2 Recommendations

The policy implications of this study can be summarized in the following points. First and for most, return on asset, return on equity, lending rate, loan to deposit ratio, bank size, GDP, and inflation were the significant drivers of NPLs in Ethiopian commercials banks. Hence, by focusing on these variables the firm can reduce the probability of nonperforming loans in Ethiopian commercial banks. Other researcher are encouraged to ingestion other important variable such as operational efficiency; risk , income diversification as variables these could affect the performance of NPL of banks.

Direction for Further Research

This study examined both bank specific and macroeconomic determinants of nonperforming

Loans of senior commercial banks in Ethiopia using selected variables. However, there are so Many variables those were not included in this study. Thus, future researchers may be interested in Validating the consistency of the result and provide supplementary results for this study by Including other variables like ownership, unemployment rate, efficiency and the like on the same banks. Furthermore, the same study may be required on newly emerging banks.

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For appendix

A: Distribution of Npl

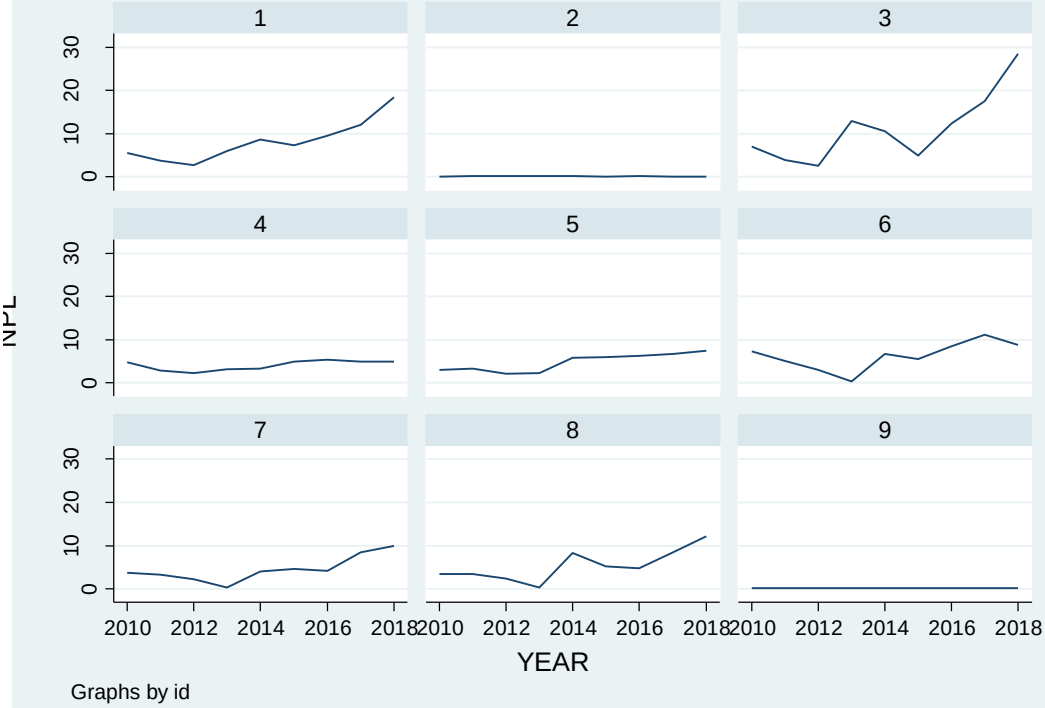

Figure 3 distribution of npl

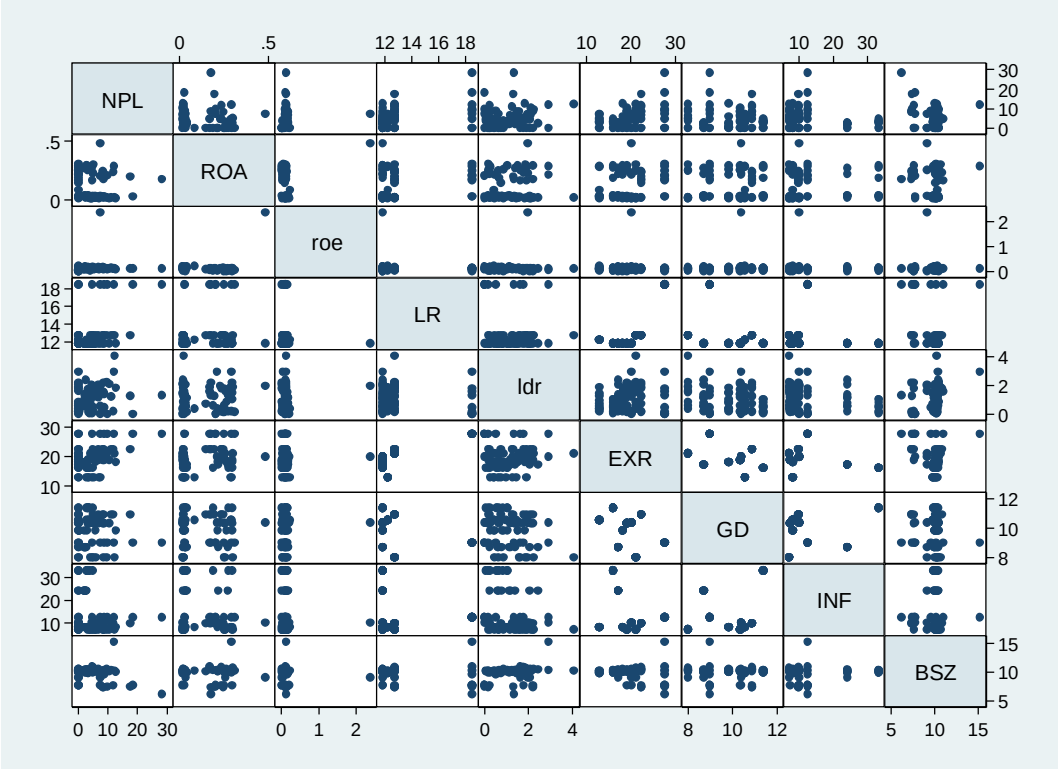

Figure 4 graphic correlation matrix

B: Normality test for Residuals

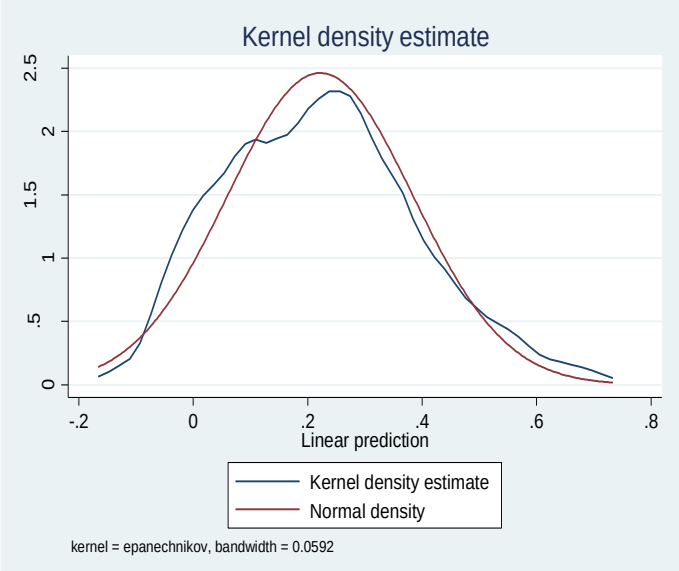

Figure 5 kernel density and normality density

C: Breusch and pagan LaGrange multiplier test for REM

```
Breusch and Pagan Lagrangian multiplier test for random effects

        npl[company,t] = Xb + u[company] + e[company,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+------------------------------
                     npl |    .0536664       .2316602
                       e |    .0219462       .1481425
                       u |    .0093342       .0966136

        Test:   Var(u) = 0
                             chibar2(01) =    16.16
                          Prob > chibar2 =   0.0000
```

Here we failed to accept the null and c