



COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF ACCOUNTING & FINANCE

**DETERMINANTS OF NON- PERFORMING LOAN IN COMMERCIAL BANK'S IN
ETHIOPIA**

BY:

BERHANU BLEAY BEYENE

**A THESIS SUBMITTED TO THE DEPARTMENT OF ACCOUNTING AND FINANCE
AS A PARTIAL FULFILMENT OF THE REQUIREMENTS FOR MASTER OF
SCIENCE DEGREE IN ACCOUNTING AND FINANCE.**

ADDIS ABABA, ETHIOPIA

NOVEMBER, 2019

COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF ACCOUNTING AND FINANCE

**DETERMINANTS OF NON- PERFORMING LOAN IN COMMERCIAL BANK'S IN
ETHIOPIA**

BY:

BERHANU BLEAY BEYENE

ADVISOR: SEWALE. A (Ph.D.)

**A THESIS SUBMITTED TO THE DEPARTMENT OF ACCOUNTING AND FINANCE
AS A PARTIAL FULFILMENT OF THE REQUIREMENTS FOR MASTER OF
SCIENCE DEGREE IN ACCOUNTING AND FINANCE.**

ADDIS ABABA, ETHIOPIA

NOVEMBER, 2019

Statement of Declaration

I, Berhanu Belay, declared that this thesis entitled “Determinants of non-performing loans in commercial banks in Ethiopia” Is my original work, prepared under the guidance of Sewale Abate (Ph.D.). All resources used in the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

Name: Berhanu Belay

Email: birhanubelay91@yahoo.com

Signature_____

Date_____

Addis Ababa University

College of Business and Economics

Department of Accounting and Finance

Certification

This is to certify that the thesis prepared by Berhanu Belay, “Determinants of non-performing loans in commercial banks in Ethiopia” And submitted in partial fulfillment of the requirements for the degree of Master of Science in Accounting and Finance complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

Approved by:

External Examiner: _____ Signature_____ Date_____

Internal Examiner: _____ Signature_____ Date_____

Advisor: Sewale Abate (PhD) _____ Signature_____ Date_____

Abstract

Determinants of non-performing loans in commercial banks in Ethiopia.

Berhanu Belay

Addis Ababa University, 2019.

This study examines the determinants of non-performing loans evidenced by commercial banks of Ethiopia. The study uses explanatory research design and quantitative research approach with secondary panel data utilized over the study period 2009-2018(10 years). More specifically, the study adopts an ordinary least squares (OLS) model. The finding of the study reveals that; operational efficiency measured by the cost to income ratio, financial performance measured by return on asset, loan to deposit ratio measured by total loan to total deposit, and capital adequacy ratio found the most significant variables affects the banks' non-performing loan from bank-specific factors. While loan loss provision and bank size found insignificant in determining the non-performing loan of banks. Furthermore, from macro-economic variables; inflation is the only significant variable that determines the non-performing loan of the commercial banks in Ethiopia. On the other hand, variables like GDP growth rate, lending interest rate, and exchange rate are found as insignificant variables in determining non-performing loans. This study suggests that Ethiopian Commercial Banks shall search an investment opportunity in order to diversify its source of revenue and deliberately shift its source from the traditional income (interest) to different sources of income in a bid to decrease non-performing loans of the banks.

Keywords: Non-Performing Loans, commercial of Ethiopia, Ordinary least square.

Acknowledgments

It gives me great pleasure to extend my sincere gratitude for the help I have received from different people and institutions. I would have never been able to complete this thesis without their kind support

First and foremost, I would like to thank Almighty God who gave me enough strength to finalize the study. Secondly, I would like to thank my advisor, Dr. Sewale Abate, for his guidance and constructive comments. I am also grateful to the National bank of Ethiopia staff for providing all the necessary data.

Table of Contents

Statement of Declaration	iii
Abstract.....	v
List of table	ix
List of Acronyms	x
CHAPTER ONE.....	1
Introduction	1
1.1. Backgrounds of the study	1
1.2. Statements of the problem	3
1.3. The objective of the Study	5
1.3.1. General Objective	5
1.3.2. Specific Objective	5
1.4. Hypotheses of the Study.....	5
1.5. Significance of the Study.....	6
1.6. Scope of the study.....	7
1.7. Limitation of the study	7
1.8. Organization of the study	7
CHAPTER TWO.....	9
Literature Review	9
Introduction	9
2.1. Theoretical Concept of None performing loan (NPL)	9
2.2. Five Cs of Nonperforming/Bad loans	9
2.3. The consequence of NPLs	10
2.4. The Evaluations of Credit Risk	11
2.5. Criteria for credit evaluation	12
2.5.1. Character	12
2.5.2. Capacity.....	12
2.5.3. Capital	13
2.5.4. Condition	13
2.5.5. Collateral	13
2.6. Theories of Non – performing loans	13
2.6.1. Firm Characteristics Theories	14
2.6.2. Theory of Multiple-Lending	14

2.6.3.	Loan Pricing Theory	14
2.6.4.	Credit Market Theory	15
2.6.5.	The Signaling Arguments.....	15
2.7.	Determinants of Non-performing loans.....	15
2.7.1.	Bank specific factors.....	17
2.7.2.	Macroeconomic factors.....	20
2.8.	Empirical literature review	22
2.9.	Summary and Knowledge Gap.....	28
2.10.	Conceptual framework.....	30
Chapter Three: Research Design and Methodology		31
Introduction		31
3.1.	Research Approach.....	31
3.2.	Research Design.....	31
3.3.	The population of the study	32
3.4.	Sampling technique and sample size	32
3.5.	Data source and type.....	33
3.6.	Data analysis.....	34
3.7.	Model Specification.....	34
CHAPTER FOUR.....		40
Data analysis, Interpretations, and Presentations		40
Introduction		40
4.1.	Descriptive Statistics.....	40
4.2.	CLRM Assumption and Diagnostic Test.....	42
4.3.	Model Specification Test.....	47
4.5.	Discussion of banking specific factors.....	49
4.6.	Discussion of Macroeconomic variables.....	51
CHAPTER FIVE.....		53
SUMMARY OF MAJOR FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS		53
INTRODUCTION.....		53
5.1.	Summary and Conclusion	53
5.2.	Recommendations	54
5.3.	Suggestion for future research.....	55
REFERENCES.....		Error! Bookmark not defined.

List of table

Table 3. 1: List of banks in Ethiopia -----	31
Table 3.2: List of sample selected banks-----	31
Table 4. 1: Summary of Descriptive Statistics-----	39
Table 4. 2: Heteroscedasticity Test: -----	42
Table 4. 3: Autocorrelation test-----	43
Table 4. 4: Multicollinearity test-----	44
Table 4.5: Model Specification-----	46
Table 4. 5. Regression Results t identifying the determinants of NPLs in Commercial banks in Ethiopia (both private and government-owned commercial banks).	48

List of Acronyms

BSZ:- Bank size

CAR: - Capital adequacy

CLRM: Classical Linear Regression Model

EX;- Exchange rate

GDP: - Gross Domestic Product

IND: - Investment Diversification

INF:- Inflation rate

MoFEC: Ministry of Finance and Economic Cooperation

NBE: National Bank of Ethiopia

NPL: - Non-performing loan

OLS: Ordinary Least Square

OPRE: - Operational efficiency

LTDR: - Loan to Deposit ratio

LR: Lending Rate

LLP: - Loan loss provision

ROA: Return on Asset

CHAPTER ONE

Introduction

This chapter provides general information about the research topic in order to give some clues to the readers about the study area. The chapter begins with the background of the study then followed by the statement of problems, research hypothesis, overall objectives of the study, significance of the study and finally scope, limitation, and organization of the paper.

1.1. Backgrounds of the study

The bank's role in the economy of any country is very significant. They play intermediation function in that they collect money from those who have excess and lend it to others who need it for their investment. According to Rawlinet *al.* (2012), the principal aim of any business is to make profits. That is why any asset created in the conduction of business should generate income for the business. Since this issue is applicable for the banking sector business, banks should give due consideration on the management of loans because lending is the main business of commercial banks and loan is normally the main assets and vital source of revenue for the commercial banks (Daniel and Wandera, 2013). Therefore, banks do grant loans and advances to individuals, business organizations as well as the government in order to enable them operates on investment and development activities as a mean of contributing toward the economic development of a country in general and aiding their growth in particular. Availing credit to borrowers is one means by which banks contribute to the growth of economies. Credit creation is the main income-generating activity of banks. The loan portfolio is typically the largest asset and the predominate source of revenue of banks (Achou and Tenguh 2008). But, credit risk is considered as the most harmful as nonperforming loans (NPLs) would impair the bank profitability and its long-term operation significantly (Ahmed 2006).

Deposits in banks are offset by higher margins from the creation of credits as loans. However, if such assets do not generate any income, the banks` ability to repay the deposit amount on the due date would be in question. Therefore, the banks with such assets would become weak and such weak banks will lose the faith and confidence of the customers. Ultimately, unrecoverable amounts of loans are written off as Nonperforming loan and this has led to a

significantly increased level of non-performing loans (NPLs), which affects the liquidity and profitability of banks and thereby the financial stability of the banking systems is going to affect in general (Mallick *et al.*, 2010) as cited in Rawlin *et al.* (2012). To identify causes for loan default a number of studies were conducted across the world and the finding was varied in different countries and have a multidimensional aspect both, in developing and developed nations. For example, the study of Calice (2012) for the Tunisian banking sectors found as the banking sectors suffers from a decline in asset quality. In addition, Blanco and Gimeno (2010) for South African banks and Kolapo (2012) for the Nigerian banks, NPLs have an adverse effect on banking sector survival. Thus, since nonperforming loans had an adverse effect on the banking sectors' survival, the cause for NPLs should be given due consideration. Its causes are different indifferent countries that might be due to situational factors such as the level of economic condition in which the banking sectors are operating and also bank-level factors. Theoretically, there are so many reasons as to why loans fail to perform. Some of these include depressed economic conditions, high real interest rate, inflation, lenient terms of credit, credit orientation, high credit growth, and risk appetite, and poor monitoring among others (Bercoff *et al.* 2000).

In the context of Ethiopia, commercial banks are rapidly increasing their growth of loan outreach in the last two decades (Mesay, 2017). But evidence shows Ethiopian commercial banks were also suffered from serious financial fragility manifested by a high proportion of NPLs (Mehari 2012). Recently, the NPLs of ECBs have shown a substantial improvement and lowered to an average of 5 % (National Bank of Ethiopia 2011). However, NPLs of ECBs are still high as compared to the developing economy banks like Namibia, Mozambique, and Uganda (Tsige, 2013). Hence, this study focused on the main determinants of non-performing loans in the context of Ethiopian commercial banks. In doing so, a number of specific bank factors and macro-economic variables were reviewed from different pieces of literature and included in the study in order to identify the most determinants of non-performing loans in commercial banks evidenced from Ethiopia.

1.2. Statements of the problem

The issues of Nonperforming Loans (NPLs) are gaining increasing attention in the past few decades. Poor loan management will contribute to NPLs. It is a critical issue for every bank to manage bad loans. Many countries are suffering from Nonperforming Loans (NPLs) in which banks are unable to get profit out of loans (Pettersson and Wadman, 2004). If the loan is well managed; it will increase the bank's profitability and sustainability in the future. However, if failed to do so, it will be a major threat to their survival (MacDonald, 2006). With this regard, a number of studies were conducted across the world to determine the determinant factors of non-performing loans and some of them are; Caprio and Klingebiel (2002), Fofack (2005), Pasha and Khemraj (2009) and Azeem et al. (2012) agreed the existence of banking and financial crises has frequently been allied with a massive accumulation of NPLs. As noted in Caprio and Klingebiel (2002), during the 1997s East Asian banking and financial crises, many banks were increased by more than threefold in their volume of NPLs in the period leading up to the crisis. For instance, in Indonesia, NPLs of banks represented about 75% of their total loan which led to the collapse of over sixty banks. Furthermore, Fofack (2005) stated most banks in sub-Saharan African countries were also preceded by a rapid accumulation of NPLs during the 1990s crisis. For instance, in Benin, all banks were collapsed and their NPLs were above 80% of their total loans. More recently, there are abundant pieces of evidence that the current global financial crisis, which was originated in the US, was also attributed to the rapid default of sub-prime loans/mortgages (Pasha and Khemraj 2009). Regardless of the implications of NPLs on the smooth functioning of banks, for anticipating banking and financial crises, the leading causes of these loans remain unknown for most countries especially in Sub-Saharan Africa (Fofack 2005). This is due to the fact most studies often used NPLs as an explanatory variable to other banking outcomes such as performance and failures. Consequently, there appears to be a very limited number of studies investigated NPLs as an explained variable (Boudriga 2009). Those limited studies were also conducted in developed countries and banks in developing economies have so far received inadequate attention in the literature (Swamy 2012).

In the context of Ethiopia, As per NBE report 2017/18, the total resource mobilized by commercial banks was 108.8 billion for the period 2016/17 and 139.9 billion for the period 2017/18. Out of total resources mobilized in 2016/17, the outstanding loan balance was shown 134.6 billion for both years. Furthermore, as per published data of NBE (2017), the number of nonperforming loans of commercial banks in Ethiopia was increased year after year. Further, by having a lot of literature on the determinants of NPLs of banks worldwide, it is important to examine in the Ethiopian context. This is due to the fact it is difficult to make a generalization about the NPLs for the developing economy based on the result of a developed economy without making any research. Besides, since the majority of bank assets are held by loans, unless the determinants of NPLs are visualized to enhance the quality of the asset, it is hard for the survival of banking sectors. Supporting this (NPL), many studies are conducted in Ethiopia. For example, Negera (2012) conducted a study on Determinants of Non-Performing Loans in the case of Ethiopian commercial Banks. Beju (2014) conducted a study on Determinants of Non-Performing Loans in the case of Ethiopian Banks. Fekadu (2018) conducted a study on Determinants of Non-Performing Loans The case of Ethiopian Banks. Gudeta (2018) conducted study on Determinants of Non-Performing Loans in project financing in the case of Development Bank of Ethiopia and Gezu (2014) conducted study on Determinants of Non-Performing Loans The case of Ethiopian Banks and all researchers were tried to identify the main determinants of non-performing loan in Ethiopia from industry perspective and some of them (Gudeta, Fekadu 2018) was unable to include macro-economic variables. While, the studies conducted by Negera (2012), Beju (2014), and Gezu (2014) have included a number of macro-economic variables like GDP and Inflation rate, but failed to use some important variables which directly affect the firms NPL like exchange rate and lending rate. Theoretically, the importance of including these variables are several studies states that high real interest rate is positively related to NPLs (Sinkey and Greenwalt (1991), Fofack (2005) and Jimenez and Saurina (2005)) and the level of exchange rate can also affect borrowers' debt servicing capacity through different channels and its impact on NPL can be positive or negative. Hence, the sign of the relationship between the exchange rate and NPL is negative in this study. The variable was measured by the annual effective Exchange rate of Ethiopian birr in terms of the dollar.

The basic argument here is that, as interest rates rise, prudent borrowers are more likely to decide that it would be unwise to borrow, whereas borrowers with the riskiest investment projects are often those who are willing to pay the highest interest rates. Hence, a positive relationship between the real interest rate and bank's NPLs is expected in this study. In this study, the average lending rate of Ethiopian banks used as a proxy measurement.

Hence, by giving consideration for the above research gap, this study focuses on the determinants of non-performing loans from the context of the Ethiopian banking sector. Additionally, the study is performed by increasing the number of banks under the study in order to see if increasing in a number of observation changes previously established finding for the same variables. Therefore; the question that this study seeks to answer is what the main determinants of non-performing loans are in the Ethiopian banking sector.

1.3.The objective of the Study

1.3.1. General Objective

The general objective of this study is to examine the determinants of non-performing loans in the banking sector from the context of Ethiopian commercial banks.

1.3.2. Specific Objective

In line with the above general objective of the study, the following specific objectives are set for the study.

1. To examine the effect of financial performance, loan growth, operational efficiency, income diversification, loan loss provision, capital adequacy, bank size, exchange rate, lending rate, Economic growth and inflation rate on the non-performing loan of banks.

1.4.Hypotheses of the Study.

The hypotheses of this study were formulated based secondary bank data collected and by referring to the existing theories and past empirical studies that have been conducted on the determinants of bank's NPLs. The hypotheses of this particular study are intended to catch the

determinants of NPLs quantitatively through a structured review of documents. In line with the broad objective of the study the following hypotheses were formulated.

H1: Financial performance has a negative and a significant effect on the bank's NPLs

H2: Loan growth has a positive and significant effect on bank NPLs.

H3: Operational efficiency has a positive and significant effect on the bank's NPLs.

H4: Income diversification has a negative and significant effect on the bank's NPLs.

H5: Capital adequacy has a negative and significant effect on the bank's NPLs.

H6: The size of a bank has a negative and significant effect on the bank's NPLs.

H7: Real GDP growth has a negative and significant effect on the bank's NPLs.

H8: Inflation has a negative and significant effect on the bank's NPLs.

H9: The exchange rate has a negative and significant effect on the bank's NPLs.

H10: The lending rate has a positive and significant effect on the bank's NPLs.

H11: Loan loss provision has a positive and significant effect on the bank's NPLs.

1.5. Significance of the Study

In general, the private and public bank will benefit from this research to understand and mitigate the root cause of credit risk by identifying NPL and to take actions appropriately. It is also useful to government bodies i.e. national bank of Ethiopia (NBE), financial policymakers that will directly be involved with a financial institution as it could provide a source of knowledge into the core business of banks specifically benefiting policymakers to understand the root cause of credit risk when they are reviewing procedures and policies. Investors who are interested to invest in financial institutions, policymakers, academicians, the bank customer, the public will benefit from this paper through the information available about the bank related to credit risk.

In addition, the finding of this study will assist managers in planning appropriate decisions in day to day activity. Above all, there could be a positive influence on the overall performance by minimizing the risk associated with non-performing loans.

Contribution to existing literature: In addition, scholars and researchers will find this study useful if they wish to use the findings as a basis for current and further research on the subject. Moreover, academic researchers dedicated to studying NPL in the country will benefit from this empirical study focused on the determinants of NPL.

1.6. Scope of the study

This research study focuses on examining the determinants of NPLs in Commercial banks in Ethiopia (both private and government-owned commercial bank). that operate in Ethiopia by taking as sample banks which operate for ten years because of this selected commercial banks have been operating long enough to give the kind of academic insight the study seeks to offer and the period of the data was delimited from 2009 to 2018, the sample size of the study is nine selected Ethiopian commercial Banks, the empirical data sample was covered from 2009-2018 to get a more accurate result. It categorizes independent factors into two groups' i.e. bank-specific factors and macro-economic factors. These variables are selected because they have strong impact on non-performing loans. So, the study is limited to bank-specific variables (banks' loan growth, income diversification, operational efficiency, financial performance, loan loss provision, and capital adequacy, and bank size) and macroeconomic variables (inflation, exchange rate and GDP growth, lending rate).

1.7. Limitation of the study

The limitation of the study lies in collecting complete data of all banks. The number of private commercial banks has reached sixteen, obtaining complete and reliable data in connection with repaired loans is however, a complex exercise owing to confidentiality of bank business. Even though the anticipated data are available in the national bank of Ethiopia, the effort was exerted to collect the data was futile exercise for the same ground.

As an alternative, therefore This constraints was dealt also with by relying on published annual reports and financial statements.

1.8 Organization of the study

The remaining part of the study is organized as follows. The next section (chapter two) presents an overview of the theoretical and empirical pieces of literature conducted on the determinants of non-performing loans. Chapter three provides the research design and method of data collection of the study; Chapter four discusses data analysis and interpretation of the study, based on collected data on the issue of the study area. Finally, the last chapter (five) consists of summaries of major findings, conclusions, and recommendations for possible solutions to the problem.

CHAPTER TWO

Literature Review

Introduction

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 Concept of None performing loan (NPL)

There is no common definition of nonperforming loans (NPLs) in the whole world since it is recognized that it is possible that what is appropriate in one country may not be so in another. There is, however, some common opinion on this issue. Accordingly, the IMF's Compilation Guide on Financial Soundness Indicators, NPLs are defined as of nonperforming when payments of interest and/or principal are past due by 90 days or more, or interest payments equal to 90 days or more have been capitalized, refinanced, or delayed by agreement, or payments are less than 90 days overdue, but there are other good reasons such as a debtor filing for bankruptcy to doubt that payments will be made in full (IMF, 2010). Besides, the Ethiopian banking regulation also defines NPL as follows Nonperforming loans and advances are a loan whose credit quality has deteriorated and the full collection of principal and/or interest as per the contractual repayment terms of the loan and advances are in question (NBE, 2008). Generally, NPLs are loans that are outstanding both in their principal and interest for a long period of time contrary to the terms and conditions under the loan contract. Any loan facility that is not up to date in terms of payment of principal and interest contrary to the terms of the loan agreement is NPLs. Thus, the amount of nonperforming loans measures the quality of bank assets (Tseganesh, 2012).

2.2.Five Cs of Nonperforming/Bad loans

As noted by MacDonald (2006), there are five Cs of bad credits that represent the issues used to guard against/prevent bad loans). These are:

Complacency: refers to the tendency to assume that because of the things we're 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.

Carelessness: indicates the poor underwriting typically evidenced by inadequate 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.

Communication ineffectiveness: inability to clearly communicate the bank`s objectives and policies. This is when the loan problem can arise. 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.

Contingencies: refers to the lenders` tendency to play down/ignore circumstances in which a loan might in default. It focuses on trying to make a deal work rather than identifying downside risk.

Competition: involves following the competitors` actions rather than monitoring the bank`s own credit standards. Banks, however, still have required expertise, experiences, and customer focus to make them the preferred lender for many types of loans. Lending is not just a matter of making loans and waiting for repayment. The loan must be monitored and closely supervised to prevent loan losses (Saba, 2018).

2.3.The consequence of NPLs

The issue of non-performing loans (NPLs) has gained increasing attention in the last few decades. The immediate consequence of a large amount of NPLs in the banking system is bank failure. Many researches on the cause of bank failures find that asset quality is a statistically significant predictor of insolvency (e.g. Dermirgue-Kunt, 1989; Barr and Siems, 1994; Bolt, Tieman 2014; Jeong, Jung, 2013; Jovovic, 2014; Saba, 2018), and that failing banking institutions always have high level of non-performing loans prior to failure.

Historically, the occurrence of banking crises has often been associated with a massive accumulation of non-performing loans which can account for a sizable share of total assets of

insolvent banks and financial institutions, especially during episodes of systemic crises (Jovovic, 2014). Deterioration in banks' loan quality is one of the major causes of financial fragility. Past experience shows that a rapid buildup of bad loans plays a crucial role in banking crises which is the Tobit regression results clearly indicate that higher non-performing loan reduces cost efficiency (Tieman 2014).

As the NPLs amount is becoming larger and larger, it deteriorates Banks' asset quality, reduces banks' efficiency and income (due to increasing provision expenses held on increasing nonperforming loans) these all adversely affect banks': image reputation, resource mobilization capacity, soundness, financial intermediation role; these, in turn, result in reduction in investment and related economic growth of countries.

2.4.The Evaluations of Credit Risk

According to valsamakis et al (2005), credit risk is the risk that a financial contract will not be accomplished according to the agreement made by the bank and the borrowers' it is the risk that the counterparty to an asset will default. Credit risk is simply defined as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms, Credit risk is also well defined by the Basel Committee on banking supervision as "potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms.

The risk that promised cash flows from loans and securities held by a financial institution may not be paid in full is credit risk (Sanders and Cornett, 2005) Commercial bank represents the largest group of depository institutions measured by asset size. They perform functions similar to those of saving institutions and credit unions-they accept deposit (liability) and make loans (asset) (Sanders and Cornett, 2005) Banks and other deposit-taking institutions are financial intermediaries whose assets consist overwhelmingly of loans to a wide variety of borrowers and whose liabilities consist overwhelmingly of deposits (Peter and Keith, 2003).

A bank exists not only to accept deposits but also to grant credit facilities, therefore inevitably exposed to credit risk (Elena Carletti, 2006). Credit risk is by far the most significant risk faced by Banks and the success of their business depends on accurate measurement and efficient management of this risk to a greater extent than any other risk (Gieseche, 2004).

The main source of credit risk include limited institutional capacity, inappropriate credit policies, volatile interest rates, poor management, inappropriate laws, low capital and liquidity levels,

direct lending, massive licensing of Banks, poor loan underwriting, laxity in credit assessment, poor lending practices, government interference and inadequate supervision by the Central Bank (Kithinji, 2010). Credit risk is critical since the default of a small number of important customers can cause large losses, which can lead to insolvency (Bessis, 2002).

2.5. Criteria for credit evaluation

This is a very sensitive stage because it helps ensure loan quality. In simple terms, the giving of credit rests on the sureness the lender has in the borrower's ability to pay (creditworthiness). Creditworthiness is the ability and the readiness of a borrower to settle his or her debt. This is one of the numerous issues that determine what should go into the credit policies of a lender. A lot of financial models come into play when assessing the creditworthiness of the deficit units. The most commonly used is the five financial analysis tools which include character, capital, capacity, condition, and collateral. These tools are generally known as the 5c's of credit (Machiraju, 2001).

2.5.1. Character

According to Machiraju (2013), Character signifies the customer's preparedness and willpower to settle his or her debt. Character is usually known when the lender engages a one on one talk with the borrowers; scrutinize their debt history and also how they manage their finances and the operational aspect of their business. Character is considered as the most important of the five cusses because refusal to do the due diligence will lead to a clear case of moral hazard.

2.5.2. Capacity

Capacity is a quantitative financial analysis to decide whether the customers have the capacity to payback what they have taken. According to Monicah&Anjru (2013), capacity is the ability of the borrower to generate cash from the overall operations to pay for the loans given. Capacity is very important to the lender because it serves as a form of assurance that the loan can be recovered.

2.5.3. Capital

Capital is also referred to as the net worth which represents funds set aside to cater for unexpected losses. Thus it serves as a cushion for the business. The lender is much interested in the capital adequacy of the borrower (Machiraju, 2004).

2.5.4. Condition

Conditions are the outward factors that can have an impact on the credit portfolio of business. This can take the form of economic policies prevailing in the country and the international market at large. Lenders will be in a safe position if they consider the effect of the economic conditions both the borrowers and themselves (Louziset,al., 2012).

2.5.5. Collateral

Machiraju (2004) defined collateral as the properties a lender in exchange for the loan given. It serves as insurance for the lender when the borrower could not settle his or her debt. Collateral is considered as insulation against default but it is not advisable for a lender to give out loans based on collateral. Many scholars and financial experts have advanced credit evaluation tools by developing another effective tool known as CAMPARI. CAMPARI is an acronym for the character, ability. It also includes margin, purpose, amount, repayment and insurance.

The procedure employed in the granting of loans determines the quality of a loan. According to Boudrigaet,al. (2009). credit officers should not only consider these five (5) C's but to gain a better understanding of how to analyze the credit risk factors, some principal economic determinants that control the performance of a loan portfolio and the impact these economic factors have on one another must be determined. These factors include inflation, interest rate, GDP, the market value of collaterals.

2.6.Theories of Non – performing loans.

Among many factors, credit risk is the major factor for the success and survival of the private and public banks. It is important to measure and control the determinants of credit risk, especially at the aggregated level by reviewing different theories. According to Rajaraman and Vasishta, 2002), macroeconomic variables should be included in credit risk analysis since they

have considerable influence on the changes in credit risk at the aggregated level. Negative changes in macroeconomic variables are usually treated as external negative shocks (Mileris, 2012). External negative shock can be interpreted as the negative difference between the real and expected value of macroeconomic parameters. Negative shock can be spurred by the change of any macroeconomic parameter.

2.6.1. Firm Characteristics Theories

These theories predict that the number of borrowing relationships will be decreasing for small, high-quality, informational opaque and constraint firms, all other things being equal (Godlewski and Ziane, 2008). Robert and Gary (1994) cited in Hamisu (2011), state that the most obvious characteristics of failed banks are not poor operating efficiency, however, but an increased volume of non-performing loans. Non-performing loans in failed banks have typically been associated with regional macroeconomic problems. DeYoung and Whalen (1994) cited in Saba (2018) observed that the US Office of the Comptroller of the Currency found the difference between the failed banks and those that remained healthy or recovered from problems was the caliber of management. Superior managers not only run their banks in a most efficient fashion, and thus generate large profits relative to their peers, but also impose better loan underwriting and monitoring standards than their peers which result in better credit quality.

2.6.2. Theory of Multiple-Lending

It is found in the literature that banks should be less inclined to share lending (loan syndication) in the presence of well-developed equity markets. Both outside equity and mergers and acquisitions increase banks' lending capacities, thus reducing their need for greater diversification and monitoring through share lending (Rajan and Dhal, 2003).

2.6.3. Loan Pricing Theory

Banks cannot always set high-interest rates. Banks should consider the problems of adverse selection and moral hazard since it is very difficult to forecast the borrower type at the start of the banking relationship. If banks set interest rates too high, they may induce adverse selection problems because high-risk borrowers are willing to accept these high

rates. Once these borrowers receive the loans, they may develop moral hazard behavior or so called borrower moral hazard since they are likely to take on highly risky projects or investments ((Mileris, 2012). From the reasoning of Stiglitz and Weiss (2000), specify that in some cases we may not find that the interest rate set by banks is commensurate with the risk of the borrowers.

2.6.4. Credit Market Theory

A model of the neoclassical credit market postulates that the terms of credits clear the market. If collateral and other restrictions (covenants) remain constant, the interest rate is the only price mechanism. With an increasing demand for credit and a given customer supply, the interest rate rises, and vice versa. It is thus believed that the higher the failure risks of the borrower, the higher the interest premium (Mileris, 2012).

2.6.5. The Signaling Arguments

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

2.7.Determinants of Non-performing loans

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

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

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

According to Arestis and Sawyer (2001), the second theoretical concept derived from asymmetric information is 'moral hazard', which can be applied to NPLs. A borrower may have incentives to misallocate funds for personal use and to undertake investment in unprofitable projects that serve only to increase their personal power or stature. Thus, a lender has subjected to the hazard that the borrower has incentives to engage in activities that are undesirable from the lender's point of view: that is, activities that make it less likely that the loan will be paid back. In addition, banks credit managers may intentionally provide loans to lower quality debtors. Ultimately, it could be concluded that asymmetric information often leads to the emergence of economic and financial problems especially NPLs in the credit market. Therefore, it can be said that the economic and commercial banks will not operate as efficiently as they should, in the

absence of sufficient information, related to both clients and the general environment. Hence, by having the theory of asymmetric information as a standing point the following sections discussed the determinants of NPLs that are intended to cover under this study. It should be noted that all the determinants of NPLs that are discussed in the following sections do not necessarily have a direct relationship with the theory of asymmetric information.

2.7.1. Bank specific factors

Bank-specific variables refer to those factors which characterized individual banks. Those factors can be influenced by managerial decisions and usually associated with the specific policy choices of a particular bank with regard to its efforts to maximize efficiency and improve its risk management. Hence, bank-specific variables that are usually theorized as determinants of NPLs are included, loan growth, financial performance, bank size, ownership structure, the quality of the loan portfolio and operational efficiency of banks. Hence, the following part of this particular section clearly presents the bank-specific variables that are used in this study.

Financial performance: the financial performance of a bank is usually related to the risk-taking behavior of managers (Hu et al. (2004), Jimenez and Saurina (2006), Jellouli et al (2009), Metaxas et al (2010) and Vogiazas and Nikolaidou (2011)). As noted in Hu et al. (2004), profitable banks are less engaged in risky activities as they have less pressure to create revenues. Profitable banks have an opportunity to choose a loan applicant who has strong financial performance and lower risk. Hence, as the profitability of banks increases, the probability that managers engaged in risky investment will reduce and ultimately the probability that loans become nonperforming loans will also reduce in the same manner. On the contrary, unprofitable (inefficient) banks might engage in risky lending activity in particularly when managers have short term incentives. As long as banks engaged in a risky activity the likelihood that loans become default is high and ultimately resulted in sizeable volume of NPLs.

Loan growth: The credit policy of the bank plays an essential role in determining the subsequent levels of NPLs. Loan growth has a direct (positive) association with the volume of NPLs reported by commercial banks (Sinkey and Greenwalt (1991), Keeton (1999), Salas and Saurina (2002), Jimenez and Saurina (2006) and Metaxas et al (2010)). To maximize the short-run benefits, managers seek to rapidly expand credit activities and may hence take inadequate

credit exposures. In this regard, Keeton (1999) suggests that the rapid growth of loans can be triggered by return maximization strategies. Particularly, during periods of economic growth, the financial institutions engage in market share conquest campaigns discarding the necessary assessment of credit quality of borrowers (Fernandez De Lis et al., 2000). The search for the rapid growth of loans is achieved by either reducing interest rates charged to borrowers or by lending to lower credit quality borrowers. This will lead, through adverse selection reasoning in which banks lend to lower credit quality borrowers and ultimately increase the probability of NPLs.

Capital adequacy: is an indicator of the ability of banks to provide funds for expansion and Determinants of non- Performance Loans: Evidence from Commercial Banks in Ethiopia accepting risk loss caused by the operations of the bank. The difference between total assets and total liabilities is called capital. It is the number of own funds available to support the bank's business and act as a buffer in case of adverse situations. It shows the ability of the firm that liability could be privileged. Capital adequacy is the level of capital required by the banks to enable them to withstand the risks such as credit, market and operational risks they are exposed to in order to absorb the potential losses and protect the bank's debtors. Capital adequacy is a measure of the overall financial strength of a bank. The higher the capital adequacy ratio, the higher the level of protection available to depositors and It is vital for maintaining the soundness of the banking system since it acts as a cushion against panic or bank run or uncertainties (Keovongvichith, 2012).

Income diversification: The traditional argument based on Diamond (1984) suggests the wisdom of not putting all eggs in one basket. Recently, however, there is no general consensus on the benefit of income diversification. On one side, there is a supporter of the concept of portfolio theory which states that banks can reduce firm-specific risk by diversifying their portfolios as it makes possible the compensation for losses in some products by gains in others (Winton 1999, Templeton and Severiens 1992 and Gallo et al. 1996). Hence, the potential losses on the loan activity might be overcome by looking for non-interest sources of revenues (financial revenues and capital gains). On the other side, scholars like Maksimovic and Philips (2002), DeYoung and Roland (2004) and Stiroh (2006) argued that diversification of revenue does not guarantee a low level of NPLs. Because too many operating items make the banks lose their

focus on specialized fields and reduce their monitoring effectiveness that may increase the probability of failure. Hence, banks should focus on a single line of business so as to take the greatest advantage of management's expertise which ultimately reduced the probability of NPLs.

Net interest margin (NIM): is a measure of the difference between the interest income generated by banks and the amount of interest paid out to their lenders (deposits) relative to the amount of their interest-earning assets (loan). NIM measured as the difference between interest income and interest expenses is widely regarded as an indicator of intermediation efficiency or the cost of intermediation (Raja and Sami, 2015). Fofack (2005) found evidence that net interest margins are a significant determinant of NPLs. These authors suggested that efficient intermediation is one of the most important functions of the banking system in supporting economic growth.

Bank size: The existing literature provides evidence that suggests a negative association between size of a bank and bank's NPLs (Salas and Saurina (2002), Hu et al. (2004), Cole et al. (2004), Micco et al. (2004), Garcia and Robles (2007) and Swamy (2012)). As noted in Hu et al. (2004), large banks have more resources and are more experimented for efficient information gathering, processing and analyzing to tackle moral hazard and adverse selection and ultimately better deal with bad borrowers. Small banks, on the contrary, may be exposed to the adverse selection problem because of the lack of sufficient competencies and experience to effectively assess the credit quality of borrowers. In addition, Cole et al. (2004) suggested that smaller banks adopt small business loan underwriting practices. Hence, the extent that the failure rates of small businesses are higher than those of larger and established firms.

Operational efficiency: Theoretically, the relationship between the operational efficiency of a bank and bank's NPLs might appear to be largely unrelated, because operations personnel typically do not participate in screening and monitoring loan customers, and because loan officers typically do not participate in overseeing operations costs. However, issues of NPLs and cost of efficiency are in fact related in several important ways. Hence, the impact of operational efficiency on NPLs can be positive or negative. On one hand, a number of researchers have found that failing banks tend to be located far from the best-practice frontier (Berger and Humphrey 1992, Barr and Siems 1994, DeYoung and Whalen 1994, Wheelock and Wilson 1994). A number of other studies have found a positive relationship between low cost of efficiency and NPLs even among banks that do not fail (Hughes and Moon 1995, Resti 1995).

According to Berger and DeYoung (1997), the positive association among low-cost efficiency and NPLs are hypothesized as bad management. The basic argument here is that low-cost efficiency considers as a signal of poor managerial performance (bad management), which can greatly affect the loan granting behavior of a bank. As „bad“ managers, they may a) have poor skills in credit scoring and therefore choose a relatively high proportion of loans with low or negative net present values, b) be less than fully competent in appraising the value of collateral pledged against the loans, and c) have difficulty monitoring and controlling the borrowers after loans are issued to assure that covenants are obeyed. Hence, under the „bad management“ hypothesis, there is a positive association between low-cost efficiency and NPLs. On the other hand, low-cost efficiency may have a negative impact on NPLs. However, the volume of NPLs tends to be lower as compared to banks that do not have an adequate budget to ensure higher loan quality. Thus, under the skimping hypothesis, the association between measured cost efficiency and NPLs is negative.

2.7.2. Macroeconomic factors

Macroeconomic factors are events that affect the economy on a broader level influencing the economic outcome of large groups of people on a nation or regional level and can't be controlled by bank management. The macroeconomic environment will encourage the financial sector if it promotes overall economic growth. Therefore, instability in the macroeconomic is associated with instability in banking and financial markets and vice versa. The Several macroeconomic factors which the literature proposes as important determinants of NPLs are real GDP growth, inflation rate, effective exchange rate, real interest rate, business cycle, unemployment rate, broad money supply (M2) and GDP per capita (Salas and Suarina, 2002; Fofack, 2005 and Jimenez and Saurina, 2006).

Real GDP growth: is the best way to measure a country's economy. According to Salas and Suarina (2002), real GDP growth reflects the soundness and stability of an economy that will, in turn, enhances borrowers' capacity to repay their outstanding obligation and hence reduce the amount of NPLs. There is an inverse relationship between GDP growth and the level of NPLs reported by commercial banks Jajan and Dhal (2003), Louzis et al. (2010), Salas and Suarina (2002), Fofack (2005), Hou (2006), Jimenez and Saurina (2005), Pasha and Khemraj (2009), and Azeem et al. (2012)). The explanation for the relationship is that Changes in GDP impact the

creditworthiness of borrowers in terms of repayment capacity. Thus, strong positive growth in real GDP usually translates into more income which improves the debt servicing capacity of the borrower which in turn reduces the amount of NPLs. Conversely, when there is low GDP growth, the economic activities, in general, are decreasing and the volume of cash held for either businesses or households is decreasing. These conditions contribute to deteriorating the ability of borrowers to repay the loans, which lead to increase the likelihood of delays their financial obligations and thus banks' exposure to credit risk increase.

Inflation: Higher inflation can make debt servicing easier by reducing the real value of outstanding loans particularly when the loan rates are fixed. However, it can also weaken some borrowers' ability to service debt by reducing real income. Moreover, when loan rates are variable, inflation is likely to reduce borrowers' loan servicing capacity as lenders adjust rates to maintain their real returns or simply to pass on increases in policy rates resulting from monetary policy actions to combat inflation. The impact of Inflation on NPL can be positive or negative (Fofack, 2005); Pasha and Khemraj (2009); and Nkusu (2011).

Unemployment rate: is a phenomenon that occurs when a person who is actively searching for employment is unable to find work. An increase in the unemployment rate could influence negatively the cash flow streams of households and increase the debt burden. Skarica (2013) revealed that the unemployment rate has a statistically significant negative association with NPLs with the justification of rising recession and falling during expansions and growth has an impact on the levels of NPLs. With regard to firms, increases in unemployment may signal a decrease in production as a consequence of a drop in effective demand. This may lead to a decrease in revenues and a fragile debt condition. This is based on the argument that an increase in the unemployment rate in the country negatively affects the incomes of the individuals which increases their debt burden (Bofondi and Ropele, 2011; Vogiazes and Nikolaidu, 2011).

Exchange rate: like inflation a change in the exchange rate can also affect borrower's debt servicing capacity through different channels and its impact on NPL can be positive or negative (Nkusu 2011). As noted in Pasha and Khemraj (2009), depreciation of the exchange rate can have mixed implications on borrowers' debt servicing capacity. On the one hand, it can improve the competitiveness of export-oriented firms. As long as the value of domestic currency depreciated (lower), export-oriented firms can dominate the international market at a lower price

(since their production cost is covered in the domestic currency which has a lower value than foreign currency and their revenue is collected in foreign currency which has higher value as compared to the domestic currency. Hence, the depreciation of the exchange rate can improve the debt-servicing capacity of export-oriented borrowers. On the other hand, it can adversely affect the debt-servicing capacity of borrowers who borrow in foreign currency (import-oriented firms).

Lending Interest rate: Asymmetric information and the resulting adverse selection problem can lead to “credit rationing,” in which some borrowers are denied loans even when they are willing to pay a higher interest rate (Stiglitz and Weiss 1981). This occurs because as interest rates rise, prudent borrowers are more likely to decide that it would be unwise to borrow, whereas borrowers with the riskiest investment projects are often those who are willing to pay the highest interest rates. In this general setting, a higher interest rate leads to even greater adverse selection; that is, the higher interest rate increases the likelihood that the lender is lending to a bad credit risk and ultimately increases NPLs (Sinkey and Greenwalt (1991), Jimenez and Saurina (2006), Pasha and Khemraj (2009), Ahmad et al (2009) and Metaxas et al (2010)).

2.8. Empirical literature review

There are many studies conducted on the determinants of NPL in the banking sector, most of them based on the relationship between bank-specific variables and macroeconomic factors. The earliest empirical study is conducted by Keeton and Morris (1987). They found that the non-performing loan that banks were taking was one of the reasons for loan losses and credit failures. Lis et al. (2000) econometrically identified loan losses through various banking and macroeconomic factors using a panel data of Spanish commercial and savings banks for the period 1985–1997. They found that gross domestic product (GDP) growth rate has a negative effect on problem loans, that bank size is negatively related to problem loans, while loan growth, collateral loans, net interest margin, and market power are positively related to that.

Nkusu (2011) analyzed the linkage between non-performing loans and the macroeconomic performance of 26 advanced economies from 1998 to 2009. He used only macroeconomic variables in his study. His findings revealed that a poor macroeconomic performance (i.e. slower GDP growth, higher unemployment or decreasing asset prices) could be related to the increasing

non-performing loans in advanced economies. The findings of the study of De Bock and Demyanets (2012) showed that GDP growth rate, exchange rates, and loan growth are the main determinants of NPLs in the examined countries. In contrast to Nkusuhe analyzed the determinants of bank asset quality in 25 emerging countries during 1996–2010, by examining only aggregate macroeconomic and credit indicators.

Makri and Papadatos (2012) econometrically identify the determinants of credit risk in the Greek banking sector by using LLP as a proxy of loan defaults, for the period from 2001 to 2012. They found that LLP is positively affected by the unemployment rate and public debt, but negatively affected by capital adequacy ratio. There are many studies that are based on panel cross-country analysis. The regression model of Mileris (2012) indicates that there is a strong relationship between changes in the macroeconomic environment and the performance of loans. He states that the unemployment rate and interest rates have a strong influence on the quality of loans in the banks. Saba (2012) argues that there is significant dependency among NPL ratio and interest rates and between total loans and NPL rate.

Moinescu (2012) studied the determinants of NPLs in Central and Eastern European countries (CEE) during the period between 2003 and 2011. Econometric results of his research confirm that GDP growth is the prominent macroeconomic explanatory variable of NPLs developments among CEE economies. He found that real GDP growth and the change in the output gap were almost equally important. His analysis reveals a strong determination influence with a short-term impact of the economic performance on the non-performing loans ratio dynamics across the CEE banking systems. A stylized representation of the change in the banking book quality as a function of the amplitude of the business cycle suggests that the larger the difference between peak and depth of economic growth, the higher the NPL ratio jump during the recession period (Moinescu, 2012, 56). Similar findings were reported by Mileris (2012).

Makri et al. (2014) identified the factors affecting the NPL rate in Eurozone's banking sector for the period between 2000 and 2008. Their findings reveal strong correlations between NPLs and various macroeconomic (public debt, unemployment, annual percentage growth rate of GDP) and bank-specific factors (capital adequacy ratio, rate of nonperforming loans of the previous year and ROE). Precisely, they found a statistically significant and negative correlation between NPLs and ROE. They also found a statistically significant and positive relationship between the

dependent variable NPLs and its lagged value; 2) NPLs and public debt; 3) NPLs and the unemployment rate. A notable branch of literature is related to the appraising role of bank-specific factors based on balance sheets of banks.

Tabak (2005) employs semi-annual data from the Balance Sheet and the Income Statements of Brazilian banks for the period from 2000 to 2005 and finds that the credit risk is the major source of operational banking risk. He concluded that a high level of NPLs indicates that banks have high credit risk and if not regularly managed may induce banking failures. A similar approach was done in Greece. Precisely, Louzis et al. (2012) used panel data methods to examine the determinants of non-performing loans in the Greek banking sector, separately for each loan category.

According to Louzis et al. (2012), the determinants of NPLs should not be seen only among macroeconomic variables considering the fact that they are external to the banking sector. Thus, the characteristic features and the choice of the policy of each bank are predicted to have an impact on the NPLs rate. The results indicate that the Greek banking sector can be explained by GDP, unemployment, interest rate, public debt and bank-specific factors such as management quality and performance. The leverage has a statistically positive influence on business and mortgage NPLs. In addition, the ROE indicator is statistically significant for a mortgage and consumer NPLs while insignificant for the business NPLs. The impact on loan categories is obvious with mortgages being the least reactive to changes in the macroeconomic environment.

Lu et al. (2005) explored the relationship between banks' lending behavior and NPLs by using the financial data from annual financial reports of all publicly listed companies. The results of this study show that the Chinese banks have a structured lending bias towards state-owned enterprises (SOE), especially those with high default risk. The study observes that the high-risk SOEs were able to borrow more than the low-risk SOEs and non-SOEs (Lu et al., 2005). Using panel regression analysis, Pain (2003) investigates the factors that can help explain the increases in loan-losses in the UK for crucial banks. He points out those macroeconomic variables can indeed affect banks' NPLs, but he states that bank-specific factors are also important considering the fact that a great percentage of lending to the riskier sector, such as commercial companies, has been usually linked to higher provisions (Pain, 2003). Espinosa and Prasad (2010) concluded that the NPLs ratio aggravates as economic growth weakens and interest rates rise by using

dynamic panel data from 80 banks in the Gulf Cooperation Council (GCC). Their model suggests that bad macroeconomic conditions may indeed affect the future levels of NPLs ratios.

Vector autoregressive (VAR) effects were also examined in order to look for the feedback that increasing NPLs might have on economic growth. Economic activity should be strongly, statistically and significantly affected by credit according to this panel VAR model. Finally, according to Figlewski et al. (2012), the following macro factors are believed to have a great impact on banks' creditworthiness: Factors related to general macroeconomic environment (unemployment rate, inflation, etc.); Factors related to the direction in which the economy is moving (real GDP growth, the change in consumer sentiment, etc.); Factors of financial market conditions (interest rates, stock market returns, etc.

Ahmed, Takeda, and Shawn (1998) in their study found that loan loss provision has a significant positive influence on non-performing loans. Therefore, an increase in loan loss provision indicates an increase in credit risk and deterioration in the quality of loans consequently affecting Bank performance adversely.

Zelalem (2013) examined the bank-specific and macro-economic determinants of Nonperforming loans (NPLs) of commercial banks in Ethiopia. The study adopted a mixed-methods research approach by combining documentary analysis (structured review of documents) and in-depth interviews. The findings of the study show that loan growth, financial performance, operational efficiency, effective exchange rate, inflation rate, and gross domestic product have a negative and statistically significant relationship with banks' NPLs. On the other hand, variables like bank size and state ownership have a positive and statistically significant relationship with banks' NPLs. The study suggested that focusing on and reengineering the banks alongside the key drivers of NPLs could reduce the probability of loan default in Ethiopian commercial banks.

Aemiro and Rafisa (2014) the study examined the bank-specific determinants of credit risk in Ethiopian commercial banks and quantitative research approach was adopted. A balanced panel data of 10 commercial banks both state-owned and private-owned for the period 2007 through

2011 has been analyzed using random-effects GLS regression. The regression results revealed that credit growth and bank size have a negative and statistically significant impact on credit risk.

Whereas, operating inefficiency and ownership have a positive and statistically significant impact on credit risk. Finally, the results indicate that profitability, capital adequacy, and bank liquidity have a negative but statistically insignificant relationship with credit risk.

Anisa (2015) investigated the Determinants of Nonperforming Loan in Ethiopian Commercial Banks. The study aimed to test and confirm the effectiveness of common commercial banks' nonperforming loan determinants and how it affects the level of nonperforming loans in Ethiopian commercial banks between 2004 to 2013; the study found that lending interest rate is a very important determinant of the nonperforming loan in Ethiopia banking industry. Cost efficiency had a negative and significant impact on banks' nonperforming loans. Bank solvency ratio and gross national product (GDP) growth rate and inflation rate had a negative and statistically insignificant impact on banks' nonperforming loans. The study then suggested that bank loan officers should.

Negara (2012) assessed the determinants of nonperforming loans in Ethiopian commercial banks from 2005-2010. He used the mixed research approach and a Survey was conducted with professionals engaged in both private and state-owned Banks in Ethiopia holding different positions using a self-administered questionnaire, structured review of documents and records of 8 banks. Result of the study shows that poor credit assessment, failed loan monitoring, underdeveloped credit culture, lenient credit terms and conditions, aggressive lending, compromised integrity, weak institutional capacity, unfair competition among banks, willful default by borrowers and their knowledge limitation, fund diversion for unintended purpose, over/under financing by banks attribute to the causes of loan default. Consistent with Negara (2012) the study conducted by Meshesha (2015) revealed that poor credit analysis and unsound lending practices, lack of focused loan monitoring and follow-up, lenient credit terms and conditions, compromised integrity, and fund diversion are the major factors that contribute to loan default.

Tilahun (2010) was not mainly intended to investigate the determinants of NPLs; the major aim of the study was to identify the underlying NPLs management difficulty of privately owned commercial bank of Ethiopia without including the two biggest state-owned commercial banks at that time that have higher market share in the industry. Moreover, the study used only descriptive statistics for the entire analysis without considering a lot of limitations associated with it. Similarly, the work Ayalew (2009) mainly emphasized the legal problems in realizing NPLs of the Ethiopian banking sector. Thus, the cause of NPLs was not the concern of the study since legal issues come after the occurrence of default loans.

Mesay (2017) assessed the determinants of non-performing loan growth rate. Specifically, the study sought to establish the effect of microeconomic variables (deposit Interest rate, exchange rate, and annual inflation rate), bank-specific (loan to deposit ratio, credit monitoring and follow up and loan growth rate) and business characteristic (business profit margin and nature of business). The study adopted a mixed-methods research approach by combining documentary analysis (structured review of documents) and in-depth interviews. The findings of the study show that business profit margin, deposit interest rate, loan growth rate, loan to deposit ratio, credit monitoring and follow-up and nature of the business statistically significant relationship with banks' NPLs. On the other hand, variables like exchange rate and inflation rate were found to be statistically insignificant. The study recommended that Loan growth, business profit margin, loan to deposit ratio and deposit interest rate were significant drivers of NPLs, hence focusing and engendering the institution alongside these indicators could reduce the probability of NPL in Ethiopian private commercial banks.

Meshesha (2015) assessed the determinants of NPLs in Ethiopian commercial banks and considered only bank-specific variables in their study. However, macroeconomic variables were included and analyzed the effects could be appropriate since similar studies have demonstrated these variables have a significant effect on NPLs

Beju (2014), and Gezu (2014) have included a number of macro-economic variables like GDP and Inflation rate, but failed to use some important variables which directly affect the firms NPL like exchange rate and lending rate.

Dula (2010) concentrated on managing NPL and the study used only one private bank and does not consider other private and state banks has a large amount of market share.

Tesfaye (2015) assessed the bank-specific determinants of nonperforming loans in Ethiopian private commercial banks. The quantitative research approach was adopted for the study and survey conducted with professionals engaged in these private commercial Banks of credit departments using a self-administered questionnaire and in-depth interview. The findings of the study show that poor credit risk assessment, underdeveloped credit culture/orientation, poor understanding of credit terms and conditions, imposing highest interest rate on loan, poor credit monitoring and rapid credit growth or greater risk appetite for the occurrence of nonperforming loans. The study suggested that banks should put in place appropriate terms and conditions, impose moderate lending rate, restrain from engaging in aggressive lending, put in place efficient credit process, give due emphasis in developing the competency of credit operators, proactive monitoring; organizational capacity enrichment of banks with exerted effort to develop culture of the community towards credit and its management.

2.9. Summary and Knowledge Gap

The literature review that is discussed so far showed that banks NPLs are determined by macroeconomic and bank-specific factors. The empirical evidence shows that favorable macroeconomic conditions, such as sustained economic growth, low unemployment, and interest rates, tend to be associated with a better quality of bank loans. The studies, in general, depicted the association between real GDP growth, inflation, lending interest rate, unemployment rate, and exchange rate. On the other hand, bank-specific factors like bank size, financial performance, operational efficiency, rapid loan growth, ownership type, income diversification, risk assessment, and monitoring are found to be having significance on the occurrence of NPL. However, Most of the literature that is discussed so far appeared to have focused on studies that were conducted in the banking sector of developed economies (such as United States of America, Spanish, Greek and Italian) and some emerging economies (such as Indian, Chinese, Malaysian, and Indonesia). Consequently, the Banking sectors in most developing economies like Ethiopia have so far received inadequate attention in the literature. Moreover, NPLs of different countries do not necessarily share identical immediate causes since those studies were based on data from diverse countries. In the context of Ethiopia, as knowledge of the researcher,

limited numbers of pieces of literature were conducted in the banking industry and the impact of the variables differs depending on economic condition, political stability, loan policy, etc. For instance, Negera (2012), Meshesha (2015), and Tesfaye (2015) assessed the determinants of NPLs in Ethiopian commercial banks and considered only bank-specific variables in their study. However, macroeconomic variables were included and analyzed the effects could be appropriate since similar studies have demonstrated these variables have a significant effect on NPLs. Dula (2010) concentrated on managing NPL and the study used only one private bank and does not consider other private and state banks has a large amount of market share. Mesay (2017) assessed the determinants of non-performing loan growth rate with emphasis on manufacturing sector and considered macroeconomic variables (deposit interest rate, exchange rate, and annual inflation rate), bank-specific (loan to deposit ratio, credit monitoring and follow-up and loan growth rate) and business characteristic (business profit margin and nature of business). Anisa (2015) studied the determinants of non-performing loans of commercial banks in Ethiopia. The included variables were macroeconomic (deposit rates, GDP growth rate, lending interest rate, and inflation rate) and bank-specific (cost efficiency, solvency ratio, and loans to deposit ratio). Aemiro and Rafisa (2014) examined the bank-specific determinants of credit risk in Ethiopian commercial banks. Zelalem (2013) examined the bank-specific and macro-economic determinants of Non-performing loans (NPLs) of commercial banks in Ethiopia. The macroeconomic factors considered were effective exchange rate, inflation rate, gross domestic product, and lending rate; bank-specific variables were loan growth, bank size, state ownership, financial performance, operational efficiency, and income diversification. Most of these studies used descriptive analysis and correlations matrix for the analysis. These methods only provide simple summaries about the sample and don't indicate the strength of the relationship between dependent and independent variables. In addition, several studies conducted in different countries, indicate that a number of macroeconomic and bank-specific variables explained the level of NPL. In this respect, as knowledge of the researcher, few of these determinant variables are considered in similar studies conducted so far. Therefore, this study incorporates some of the significant determinants of NPL like lending interest rate and exchange rate. In addition to this, the study by maximizing the number of observations, number of banks and number of variables to see if the determinants will provide different results when compared to the previous findings. Generally, the study is expected to fill the existing literature gap in the area of the study by

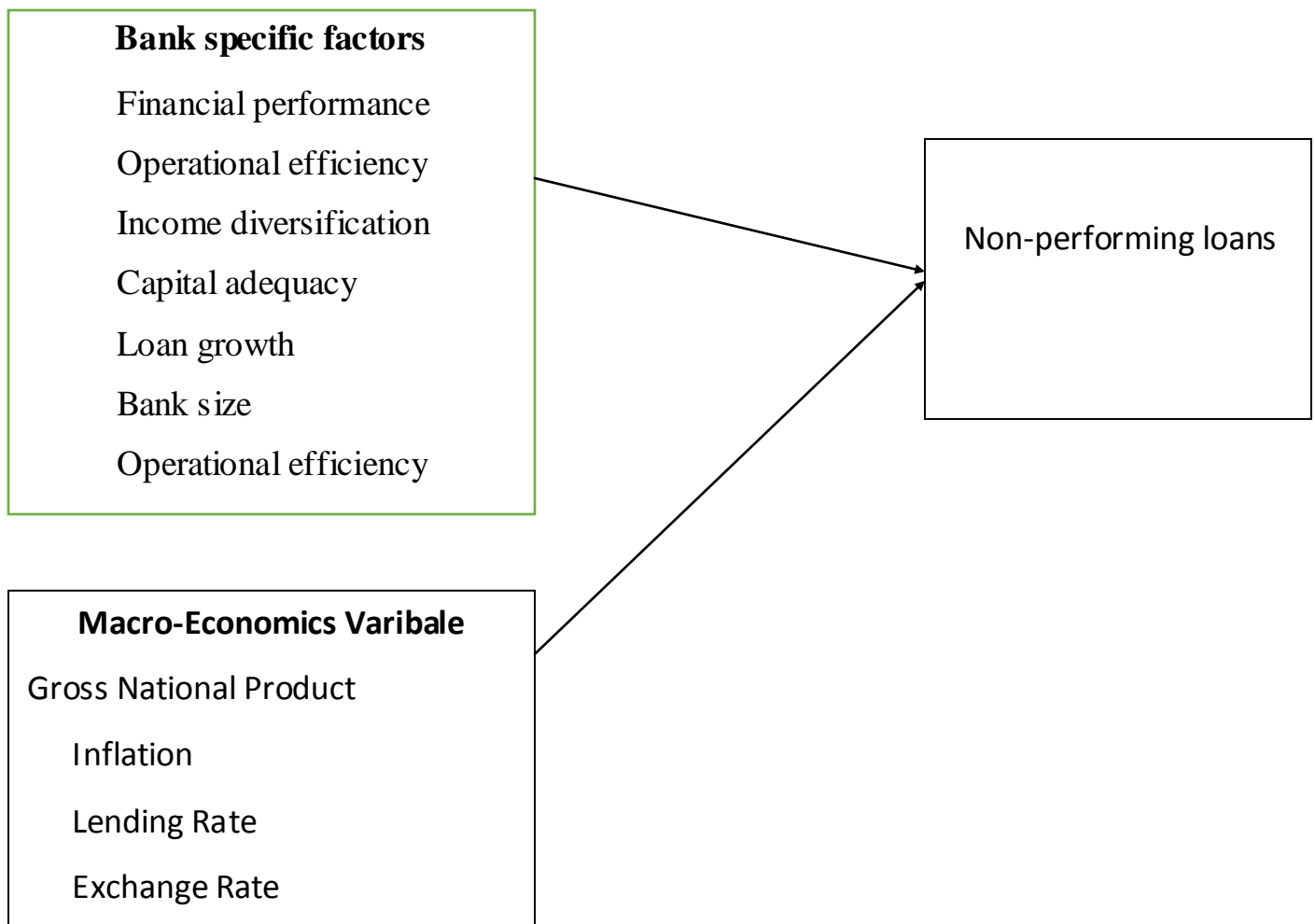
employing macroeconomic and bank-specific factors and empirically examine their effect on NPLs of commercial banks in Ethiopia.

2.10. Conceptual frame work.

As a result of the empirical review and theoretical assumptions; the study has developed the following schematic representation of the conceptual framework. In doing so, the data for determining the most important variables that should have to be included in the study were chosen according to the characteristics that they create more impact on the non-performing loan and the result of empirical reviews.

Figure 2.1: Conceptual frame work of the study

Independent Variables Dependent Variable



Source: compiled by a researcher from past empirical studies(Lis et al.2000)

Chapter Three: Research Design and Methodology

Introduction

This chapter provides the reader with an overview of the methodological considerations and assumptions underlying the research process. It describes the methods and procedures that the researcher used in order to achieve the research objectives. The chapter covers the research approach used in the study, research design, target population, sample size, source of data and data collection and finally how the data is analyzed.

3.1. Research Approach

In this study, the researcher used a quantitative research approach. The use of this method is helpful to ensure that; the data collected is effectively interpreted and analyzed using the statistical analysis and descriptive statements. According to Creswell (2003), there are three types of research approach which are familiar to business and social science research; those are quantitative, qualitative and mixed methods approach. The rational reason behind for using of quantitative research approach includes to develop knowledge of cause and effect thinking, reduction to specific variables and hypotheses and questions, use of measurement and observation, and the test of theories, employee strategies of inquiry such as experiments and surveys (Creswell, 2009). So in order to examine the determinants of non-performing loans, the researcher used the quantitative research approach.

3.2. Research Design

This study used an explanatory research design to examine the determinants of non-performing loans in commercial banks of Ethiopia. Explanatory research seeks to explain the phenomena being studied (Kothari, 2004). So, in this case, the researcher used explanatory research design to determine the correlation between non-performing loans and their determinants.

3.3. The population of the study

The population of the study consists of all banking sectors currently providing financial service and registered with the national bank of Ethiopia, the banks remain at 17, of which 16 were private and one is Public. The target population of the study was seventeen commercial banks.

3.4. Sampling technique and sample size

From the existing seventeen commercial banks that are operating in Ethiopia, nine banks were selected as the study sample by using non-probability sampling purposive sampling technique considering the operating period of 2009 up to 2018 G.C. The ground behind selecting these nine banks from the target population in accordance with the sampling technique under consideration is based on the time of establishment and availability of data (only banks those have ten and above years' experiences in the banking operations were included).

Table 3.1: List of all banking companies in Ethiopia with their establishment period.

No	Insurance Name	Year Est. (G.C.)
1	Commercial bank of Ethiopia	1963
2	Awash bank S.C.	1994
3	Absiyinna bank S.C	1996
4	Wegagen bank S.C	1997
5	United bank S.C	1998
6	Nib bank S.C	1999
7	Dashin bank S.C	2003
8	Corporative bank of oromia S.C	2005
9	Lion bank S.C	2006
10	Oromia international bank S.C	2008
11	BunnaBank S.C	2009
12	Zemen bank S.C	2009
13	AbayBank S.C	2010
14	BerhanBank S.C	2010

15	Addis international bank S.C	2011
16	DejubGlobal Bank S.C	2012
17	Enat Bank S.C	2013

Source: (NBE, 2018 G.C)

Table 3.2: List of study sample banks in Ethiopia.

No	Insurance Name	Year Est. (G.C.)
1	Commercial bank of Ethiopia	1963
2	Awash bank S.C.	1994
4	Absiyinna bank S.C	1996
5	Wegagen bank S.C	1997
6	United Bank S.C	1998
7	Nib bank S.C	1999
8	Dashin bank S.C	2003
7	Bunna international bank S.C	2009
9	Zemen bank S.C	2009

Source: (NBE, 2018 G.C)

3.5.Data source and type

There are mainly two sources of data, namely; primary and secondary sources. In order to gather the required information to attain the research objective, the main source of data for this study was the secondary data. Based on types there are three types of data, namely; time-series, cross-sectional and panel or pooled data. According to Gujarati (2009) panel data has the combination of both cross-sectional and time-series, it is more useful data as it captures individual variability (cross-sectional information) and dynamic nature of the data (time-series information) and also it ensures more variability or more degree of freedom, more efficiency and less collinearity among the variables. Therefore, to conduct this study, the researcher used a balanced panel data (companies have the same number of observations).The secondary source of data for this study was the past ten years (2009-2018 G.C) financial data, i.e. balance sheet and income statement of

each bank. Therefore, the data were obtained from the National Bank of Ethiopia and the respective commercial banks' annual reports.

3.6. Data analysis

Data analysis is the coming task following the data collection in which the application of the statistical technique to evaluate data through inspecting, transforming and modeling data to draw useful information or decision making. “The term analysis refers to the computation of certain measures along with searching for patterns of relationship that exist among data-groups” (Kothari, 2004). Hence, statistical techniques such as descriptive statistics and regression were performed to analyze the collected data. The descriptive statistic used to determine the minimum, maximum, mean and standard deviation. Then, multiple linear regression analysis was used to determine the relative importance of explanatory variables in influencing the dependent variable of commercial banks in Ethiopia. To conduct this study, the researcher used statistical tools E-views 10 software. The study has also performed diagnostic tests to ensure whether the OLS assumptions are violated or not and other related tests.

3.7. Model Specification

In order to investigate the determinants of non-performing loans in Ethiopia commercial banks, there is an estimated equation where NPL of commercial banks in Ethiopia is reflected as a function of the following variables.

$$\begin{aligned}
 NPL_{it} = & \beta_0 + \beta_1 (ROA)_{it} + \beta_2 (LG)_{it} + \beta_3 (CA)_{it} + \beta_4 (ID)_{it} + \beta_5 (BS)_{it} \\
 & + \beta_6 (OPRE)_{it} + \beta_7 (GDP)_{it} + \beta_8 (INF)_{it} + \beta_9 (EX)_{it} \\
 & + \beta_{10} (LLP)_{it} + \beta_{11} (LR)_{it} + U_{it}
 \end{aligned}$$

Whereas; i denote the cross-section, t denotes the time-series dimension $\beta_0 =$ the intercept $\beta_1, \dots, \beta_{11}$ = is the parameter to determine the independent variable,

NPL (non-performing loan) = the dependent variable.

ROA = financial performance measured by return on asset

LG = loan growth

OE = operational efficiency

CA = Capital adequacy

GDP = economic growth rate

ID = income diversification

INF = inflation rate

BS = bank size

EX = level of exchange rate

LLP = loan loss provision

LR = lending interest rate

Ut = the error term.

Dependent Variable

As mentioned in the literature review part of this study, there is no global standard to define NPLs at the practical level. Variations exist in terms of the classification system, the scope, and contents. Nevertheless, as far as this study intends to investigate determinates of NPLs in ECBs, the measurement of NPLs is in accordance with the NBE directive. As per the NBE (2012) directive, NPLs are classified as Substandard, Doubtful and Loss. Hence, the ratio of NPLs to total loans was used as a proxy for this study.

Independent variables

Loan growth: as mentioned in the literature, to maximize the short-run benefits, managers seek to rapidly expand credit activities. The search for the rapid growth of loans is achieved by either reducing interest rates charged to borrowers or by lending to lower credit quality borrowers (Fernandez De Lis et al., 2000). This will lead, through adverse selection reasoning (lending to lower credit quality borrowers) and ultimately increase the probability of NPLs. Empirically; various Studies found a strong positive relationship between rapid credit growth and NPLs (Sinkey and Greenwalt 1991, Weinberg 1995, Keeton 1999 Salas and Saurina (2002), Jimenez and Saurina (2006) and Metaxas et al (2010)). Hence, a positive relationship between loan growth and NPLs is expected in this study. The variable used to capture credit growth was constructed by finding the annual percentage change in the loan portfolio for each Ethiopian commercial bank.

H1: There is a significant positive relationship between loan growth of a bank and the bank's NPLs.

Operational efficiency: as shown in the literature, the relationship between the operational efficiency of a bank and the bank's NPLs can be positive or negative. A number of researchers have found a positive (Berger and Humphrey 1992, Wheelock and Wilson 1994) and a negative (Hughes and Moon 1995, Resti 1995) relationship between the cost of efficiency and NPLs. Hence, the sign of the coefficient estimate among operational efficiency and NPLs

have remained positive in this study. Cost to income ratio of Ethiopian commercial banks used as a proxy measurement to capture the operational efficiency of banks.

HP2: There is a significant positive relationship between the operational efficiency of a bank and the bank's NPLs.

Financial performance: As noted by Hu et al. (2004), profitable banks are less engaged in risky activities as they have less pressure to create revenues. At the opposite, inefficient institutions might engage in risky lending in particular when managers have short term incentives. In this regard, many scholars found a negative association between the financial performance of a bank and bank's NPLs (Jimenez and Saurina (2006), Jellouli et al (2009), Metaxas et al (2010) and Vogiazas and Nikolaidou (2011)). Hence, a negative relationship is expected in this study. In this study, the financial performance of a bank was measured by the ratio of Return on assets (ROA).

HP3: There is a significant negative relationship between the financial performance of a bank and the bank's NPLs.

Income diversification: as mentioned in the literature review part of this study, there is no general consensus on the benefit of income diversification. In this regard, vast empirical literature found both a significant positive (Lepetit et al. (2007), Stiroh (2002, 2006) and negative (Winton 1999, Templeton and Severiens 1992) association between income diversification and NPLs. Hence, the sign of the coefficient between income diversification and NPLs is expected to be negative in this study. The variable used to capture the income diversification of banks was measured by the ratio of non-interest income to the total assets of banks.

HP4: There is a significant negative relationship between income diversification of a bank and the bank's NPLs.

Bank size: The empirical evidence relating to the impact of bank size on NPLs suggested an inverse relationship (Rajan and Dhal, 2003; Salas and Saurina, 2002; Hu et al, 2006). According to these studies, the inverse relationship means that large banks have better risk management strategies and technology which definitely allows them for efficient information gathering, processing and analyzing which finish up with lower levels of NPLs as compared to smaller

banks. Hence, a negative relationship between the size of a bank and the bank's NPLs is expected in this study. The size of a bank was measured by the Natural log of total assets.

HP5: There is a significant negative relationship between the size of a bank and the bank's NPLs.

Capital adequacy (CAR); empirically, there is no consensus on the relation between capital adequacy and NPLs. Sinkey and Greenawalt (1991) show that banks with adequate capital ratios experience lower rates of NPLs. Others found a positive relationship between NPLs and capital adequacy ratio. Banks with high levels of CARs might be encouraged to embark on riskier activities leading to riskier credit portfolios (Saba et.al. 2012 and Rime 2011). Makri et al., (2014) suggest that a negative relationship with NPLs since CAR increase absorb a risky loan portfolio is marked by a high NPL. The study expected negative relation with NPLs.

HP6. Capital adequacy ratio has a significant negative relation with Nonperforming loans.

Real GDP growth: the empirical evidence suggested a negative relationship between the growth in real GDP and NPLs (Salas and Suarina, 2002; Rajan& Dhal, 2003; Fofack, 2005; and Jimenez and Saurina, 2005). The explanation provided by the literature for this relationship is that strong positive growth in real GDP usually translates into more income which improves the debt servicing capacity of the borrower which in turn contributes to lower NPLs. Hence, a negative relationship between GDP and NPLs is expected in this study. The variable used to capture real GDP growth was constructed by finding the annual percentage change in the real GDP.

HP7: There is a significant negative relationship between real GDP growth and the bank's NPLs.

Lending interest rates: empirically, several studies report that high real interest rate is positively related to NPLs (Sinkey and Greenawalt (1991), Fofack (2005) and Jimenez and Saurina(2005)). The basic argument here is that, as interest rates rise, prudent borrowers are more likely to decide that it would be unwise to borrow, whereas borrowers with the riskiest investment projects are often those who are willing to pay the highest interest rates. Hence, a positive relationship between the real interest rate and bank's NPLs is expected in this study. In

this study, the average lending rate of Ethiopian banks used as a proxy measurement.

HP8: There is a significant positive relationship between the real interest rate and the bank's NPLs.

Inflation: as mentioned in the literature, inflation affects borrowers' debt servicing capacity through different channels and its impact on NPL can be positive or negative. Empirically, Fofack (2005) found a positive relationship between inflation and NPLs in a number of Sub-Saharan African countries with flexible exchange rate regimes. On the other hand, Smadi (2010) found a negative association between inflation and NPLs in the Jordanian commercial banking sector. Hence, the relationship between inflation and the non-performing loan is negative in this study. In this study, the average annual inflation rate was used as a proxy measurement.

HP9: There is a significant negative relationship between inflation and the bank's NPLs.

Exchange rate: like inflation a change in the level of exchange rate can also affect borrowers' debt servicing capacity through different channels and its impact on NPL can be positive or negative. Hence, the sign of the relationship between the exchange rate and NPL is negative in this study. The variable was measured by the annual effective Exchange rate of Ethiopian birr in terms of the dollar.

HP10: There is a significant negative relationship between the level of the exchange rate and the bank's NPLs.

Loan loss provision: it is a controlling mechanism over expected loan losses arising from lending business and protect against anticipated loss. It measured by the ratio of loan loss provision to total loan. After reviewing pieces of empirical pieces of literature the researcher expects a positive relationship between loan loss provision and non-performing loans.

HP11. Loan loss provision has a significant positive relationship with Nonperforming loans of banks.

Table 3.3: Summary of Variables, Measurement, and Expected Sign

Symbol	Variables	Measurement	Sign
NPL	Non-performing loan	<i>NPL/Total Loan</i>	
ROA	Financial performance	<i>Net Income/Total Asset</i>	-
OPRE	Operational efficiency	<i>Expenses/ Revenue</i>	+
LTD	Loan to deposit	<i>Total Outstanding Loan/Total Deposit.</i>	+
CAR	Capital adequacy	<i>Total equity/Total asset</i>	-
IND	Investment diversification	<i>Non-interest income/Total asset</i>	-
BS	Bank size	<i>Log(Total Asset)</i>	-
LLP	Loan loss provision	<i>LLP/Total loan</i>	+
GDP	Economic growth	<i>Annual GDP rate</i>	-
INF	Inflation	<i>Annual Average inflation rate</i>	-
EXCH	Level Exchange rate	<i>Annual Average Exchange rate</i>	-
LR	Lending rate	<i>Annual Average lending rate</i>	+

Source: compiled by a researcher

CHAPTER FOUR

Data analysis, Interpretations, and Presentations

Introduction

This chapter deals with the result of the regression model and a discussion of the study. The chapter contains three parts. The first sections deal with descriptive statistics of dependent and independent variables. The second part deals test of CLRM assumptions. The third part presents and explains the result of regression outputs on the determinants of non-performing loans in Ethiopian commercial banks.

4.1. Descriptive Statistics

The distribution of the data set or dependent and independent variables used in the study are explained by descriptive statistics. The summary of descriptive statistics is presented to determine the minimum, maximum, mean and standard deviation for the dependent variable (non-performing loan) and independent Variables. The following table summarized the descriptive statistics of Ethiopian commercial banks' information for 90 observations (nine commercial banks and data of 10 years (2009-2018 GC)).

Table 4.1: Descriptive statistics of Dependent and Independent variable

	NPL	OPRE	ROA	LTDR	LR	LLP	INF	IND	GD_RATE	CAR	BSZ	EXR
Mean	5.124812	1.238096	2.041464	0.565511	12.79978	0.508788	12.81678	0.062357	9.929865	0.139092	9.836190	18.53366
Median	4.590000	1.023000	0.032000	0.560000	12.25000	0.022900	8.479000	0.045500	10.34700	0.118200	10.09100	19.07480
Maximum	28.43000	13.93700	28.97000	2.201000	18.50000	15.44900	33.23200	0.626000	11.38600	2.375300	15.25900	27.62690
Minimum	0.100400	0.001800	0.003900	0.195000	11.87500	0.000490	7.300000	0.023500	8.000000	0.007100	6.170000	10.42050
Std. Dev.	4.862123	1.572665	6.304310	0.267548	1.951734	2.061013	8.276516	0.087671	1.002167	0.245054	1.114746	4.658158

Source: compiled by a researcher from the raw data.

As can be shown in the above table 4.1 descriptive statistics; the mean value for NPL (impaired loan to total loan) of banks was 5.12 percent with a standard deviation of 4.86 percent during the given study period.

The average value of the nonperforming loans for ten consecutive years was above the average requirement of the national bank of Ethiopia (5%) and there was a big variation across the sample banks NPL ratio. NPL for the sample period was ranged from 0.10 percent to 28.43 percent, the minimum, and maximum value respectively. As far as profitability ratios concerned, ROA measured by the net profit divided by the total asset of the bank measures how much the banks are efficiently earning from funds invested by its assets.

As shown in the above table 4.1, ROA records a minimum of 0.0039% and a maximum of 28.97% with a mean of the value of 2.04%. This implies that commercial banks in Ethiopia have relatively good performance in terms of ROA during the study period. Thus, commercial banks in Ethiopia earned high returns from their assets.

The operational efficiency of the firm has a mean value of 1.238 percent and the maximum and minimum value of 13.93 and 0.0018 percent. Each observation has a standard value of 1.57 from its mean value. With regard to the size of the banks, the mean value of the variable was 9.83 percent with a maximum and minimum of 15.26 and 6.17 percent respectively.

The deviation of each observation from its mean value was 1.114 percent. The mean value of the loan to deposit ratio was 56.6 percent which shows that the average value of banks loan to deposit ratio was very high, again it tells us on average loans are the most important asset for commercial banks in Ethiopia. The standard deviation of 27.8 percent reveals that there was a high variation towards the mean and lending power among banks in Ethiopia. The maximum and minimum values were 220 percent and 19.5 percent respectively.

The mean value of lending interest rate over the period under study period was 12.8 %, this implies that on average commercial banks' lending interest rate was 12.8% and there is a modest variation on interest rate margin toward its mean value over ten consecutive years and the standard deviation of 1.95 and this implies that; each observation from mean is varied by 1.95 value with the maximum and minimum values of 18.5 % and 11.875% respectively.

The other variable was loan loss provision; the mean value for this variable was 0.50 percent and the overall maximum value of this variable is 15.44 percent and the minimum value of 0.0049

percent. With regard to the deviation of each variable from its mean, the standard deviation of this variable is 206 percent.

CAR is measured by total equity divided by total assets presents a minimum of 0.007 and a maximum of 2.37% with a mean value and standard deviation of 0.139%, and 0.245% respectively. This indicates that CAR for the sample commercial banks in Ethiopia during the study period was less than the minimum capital requirement 8% of the NBE showing that EBCs have less ability to bear loss results from loan default. Among macroeconomic variables employed in this study, inflation had a higher standard deviation which was 8.27. This implies that the inflation rate in Ethiopia during the study period remains somewhat unstable when it is compared to other macro-economic variables.

The mean value of real GDP growth rate is 9.93 % indicating the average real growth rate of the country's economy over the past ten years was a good one with averagely on two-digit growth, there was a stable economic growth because the standard deviation is 1 percent. The maximum growth of the economy was recorded as 11.386% and a minimum of 8% respectively. Moreover, the Standard deviation of the exchange rate (4.66) indicates the deviation of each observation from its mean value in terms of Ethiopian birr over the period under consideration. Thus, it can be concluded that the macroeconomic variables were relatively stable over the sample periods as compared to bank-specific variables with the exception of some instability on the inflation rate.

4.2 CLRM Assumption and Diagnostic Test

Before to test the regression model and discussion of its result, the researcher carries out the diagnostic test to make sure that the data fit the basic assumption or not. There are five basic diagnostic assumptions and the test conducted one by one of the following sections;

Assumption 1. Zero Mean: $\{E(U_t) = 0\}$

According to Brook (2014), this assumption requires that the average value (mean) of the error is zero. In fact, if the constant term is included in the regression equation, this assumption will never be violated. Since there is a constant term (C) in the regression, the mean value of the errors is zero.

Assumption 2: Heteroscedasticity ($\text{Var}(\text{ut}) = \sigma^2 < \infty$)

This assumption can be used to check whether the variance of the error is constant or not. If the assumption of constant variance is violated, the standard error could be wrong and any inference made from them became misleading. In other words, if the errors do not have a constant variance, they are said heteroscedastic (Brook, 2014). To check heteroscedasticity there are a number of methods are used, but, the Breusch-Pagan-Godfrey tests for checking for heteroscedasticity problem were applied in this study. The hypothesis of the heteroscedasticity test was formulated as follows.

H0: There is no Heteroskedasticity problem in the model.

H1: There is a Heteroskedasticity problem in the model.

$\alpha = 0.05$ Decision Rule: Reject H0 if p-value less than significant level. Otherwise, do not reject H0.

Table 4.2: Result of Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.914378	Prob. F(14,74)	0.5474
Obs*R-squared	13.12555	Prob. Chi-Square(14)	0.5167
Scaled explained SS	8.783997	Prob. Chi-Square(14)	0.8446

Source: E-views output

As shown in table 4.2 both F-statics and Chi-square version of the test statics gave the same conclusion that there is no evidence for the presence of heteroscedasticity in this particular study since the P-value is in excess of 0.05. Therefore, the error in the regression model has a constant variance or (homoscedasticity) so the null hypothesis should not be rejected.

Assumption 3: Test of Autocorrelation ($\text{cov}(\text{ui}, \text{u j}) = 0$ for $i \neq j$)

This assumption states that the covariance between the error terms over time is zero. According to Brook (2014) “it is assumed that the errors are uncorrelated with one another. If the error is not un-correlated with one another, it would be stated that they are ‘auto-correlated’ or they are ‘serially correlated’”. To check the presence of autocorrelation in the study, the researcher used the Breusch-Godfrey test, which allows the examination of the relationship between error terms

and several it's lagged value at the same time. Therefore, the hypotheses of the autocorrelation test were formulated as follows:

H0: There is no autocorrelation problem in the model

H1: There is autocorrelation in the model.

$\alpha = 0.05$

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

Table 4.3 Result of Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.073043	Prob. F(2,72)	0.9296
Obs*R-squared	0.180212	Prob. Chi-Square(2)	0.9138

Source: E-views output

As can be seen from table 4.3 both versions (X2 and F-statistics) of the test are greater than the significant value, in this case, the null hypothesis of no autocorrelation should be not-rejected since the P-value are greater than 0.05.

Assumption 4: Test of Multicollinearity

Multicollinearity means there is a linear relationship between the explanatory variables which may cause the regression model biased (Gujirati, 2009). There are two classes of multicollinearity these are; perfect and near multicollinearity. Perfect multicollinearity occurs when there is an exact relationship between two or more variables and this causes difficulty in explaining which independent variables are affecting the dependent variables. The second one is much more likely to occur in practice and would arise when there was a non-negligible, but not perfect, the relationship between the two independent variables. Then, the simplest method to investigate the existence of multicollinearity is looking at the matrix of correlations between individual variables.

Table 4.4 Result of Multicollinearity Test

Correlation t-Statistic Probability	NPL	OPRE	ROA	LTDR	LR	LLP	INF	IND	GD_RATE	CAR	BSZ	EXR
NPL	1.000000 ---- ----											
OPRE	0.270920 2.625151 0.0102	1.000000 ---- ----										
ROA	0.477707 5.071892 0.0000	-0.036119 -0.337115 0.7368	1.000000 ---- ----									
LTDR	0.088640 0.830045 0.4088	0.114353 1.073658 0.2859	-0.118310 -1.111331 0.2695	1.000000 ---- ----								
LR	0.380259 3.834900 0.0002	-0.043434 -0.405505 0.6861	0.456062 4.779906 0.0000	-0.149444 -1.409755 0.1622	1.000000 ---- ----							
LLP	0.401736 4.091865 0.0001	-0.012663 -0.118123 0.9062	0.706427 9.309480 0.0000	-0.076501 -0.715655 0.4761	0.243218 2.338820 0.0216	1.000000 ---- ----						
INF	-0.191335 -1.818243 0.0725	-0.153398 -1.447938 0.1512	-0.057377 -0.536062 0.5933	0.010985 0.102466 0.9186	-0.072798 -0.680820 0.4978	-0.031609 -0.294975 0.7687	1.000000 ---- ----					
IND	0.006391 0.059615 0.9526	-0.014649 -0.136656 0.8916	0.036657 0.342143 0.7331	0.072921 0.681974 0.4971	-0.004110 -0.038337 0.9695	0.024797 0.231363 0.8176	-0.073793 -0.690177 0.4919	1.000000 ---- ----				
GD_RATE	-0.075772 -0.708791 0.4803	-0.091462 -0.856696 0.3940	0.004188 0.039064 0.9689	-0.093954 -0.880235 0.3812	-0.350764 -3.493681 0.0008	0.041427 0.386734 0.6999	0.231656 2.221159 0.0289	0.075870 0.709714 0.4798	1.000000 ---- ----			
CAR	0.116145 1.090713 0.2784	0.027173 0.253545 0.8004	-0.008361 -0.077987 0.9380	0.081938 0.766842 0.4453	-0.060445 -0.564828 0.5736	-0.006062 -0.056546 0.9550	-0.041582 -0.388182 0.6988	0.722538 9.748431 0.0000	0.062778 0.586716 0.5589	1.000000 ---- ----		
BSZ	-0.296782 -2.898802 0.0047	0.112854 1.059404 0.2923	-0.332491 -3.288359 0.0015	0.037143 0.346686 0.7297	-0.212413 -2.027520 0.0457	-0.226237 -2.166368 0.0330	0.035778 0.333933 0.7392	-0.047511 -0.443651 0.6584	-0.042823 -0.399796 0.6903	-0.060190 -0.562433 0.5753	1.000000 ---- ----	
EXR	0.286953 2.794022 0.0064	-0.088920 -0.832685 0.4073	0.436697 4.527786 0.0000	-0.056311 -0.526073 0.6002	0.683132 8.725013 0.0000	0.274281 2.660348 0.0093	-0.086815 -0.812826 0.4185	-0.017279 -0.161188 0.8723	-0.334619 -3.312050 0.0014	0.033908 0.316451 0.7524	-0.200688 -1.910762 0.0593	1.000000 ---- ----

Activate Wi

Activate Wii
Go to PC setting

Source: E-views output

Based on the result of a correlation matrix, which is shown in the above table 4.4; it is better to discuss the issue of multicollinearity by taking the benchmarks of Cooper & Schindler (2009); which suggests that, a correlation above 0.8 should be considered as a problem of multicollinearity. So, as it can be seen from the above table correlation matrix, there is no worry of multicollinearity issue in this model; since the highest correlation is 0.75 which is found between investment diversification and economic growth. In addition to this, the relation of the dependent variable with each independent variable is performed through a correlation matrix.

Assumption 5: Test of Normality

Even if there are several tests for normality assumption, like the histogram of residuals, normal probability plot (NPP), the most common one is Bera-Jarque (1981) test. If the residuals are normally distributed, the histogram should be bell-shaped and Bera-Jarque statistics could not be significant. This means the P-value given at the bottom of the normality test screen should be bigger than 0.05 to not reject the null of the normality hypothesis that the data is normally distributed. The hypothesis of the normality test was formulated as follows:

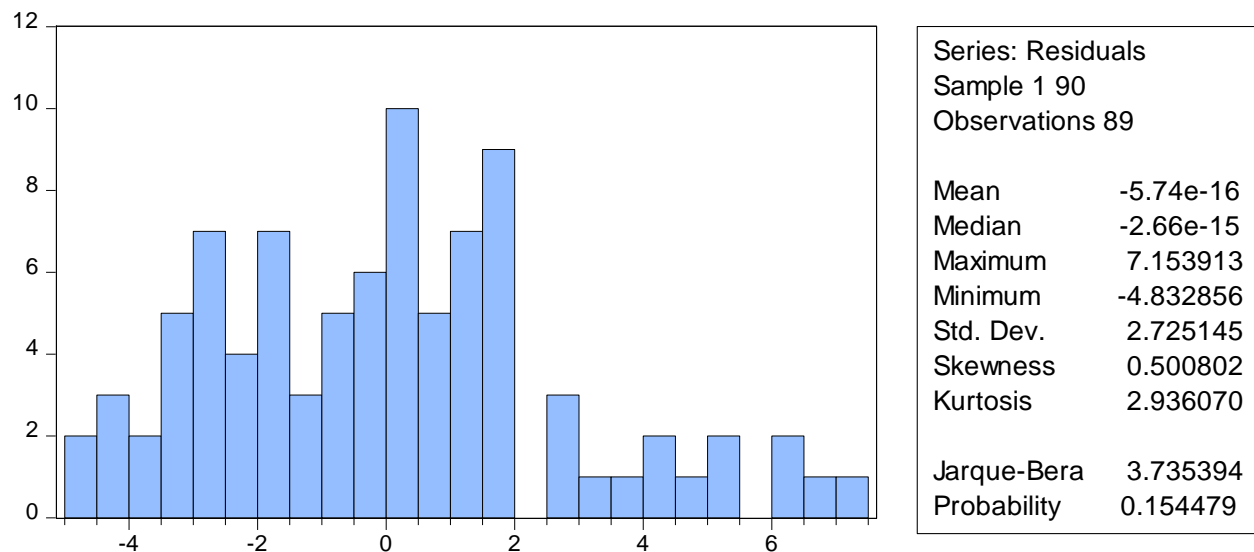
H₀: The data are normally distributed.

H₁: The data are not normally distributed.

$\alpha = 0.05$

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

Figure 4.1 Normality Test Result



Source: E-views output

There was a problem of normality due to very high NPL ratio in the observation. The NPL value was very high in the year of 2016 for the awash bank, in the year of 2018 for Abyssinia bank and in the year of 2014 for the united bank. After the remedial measure is taken, namely the outlier observation dummy the normality is fixed. As shown in figure 4.1 above, the Bera- Jarque statistics have a P-value of 0.154479 clearly implies that it is greater than 0.05, which indicates

there is no evidence for the presence of an abnormality in the data. Thus, the null hypothesis that the data is normally distributed should not be rejected since the P-values were in excess of 0.05 significant levels. It can be concluded that there is no problem with normality.

4.2. Model Specification Test

The assumption of the CLRM that the econometric model used in the analysis is correctly specified has two meanings. The first is since the model is correctly specified, there is no equation specification error and the second is no model specification error. The model specification error exists due to omission of an important variable(s), the inclusion of unnecessary variable(s), incorrect specification of the error, adoption of wrong function form and error of measurement in the regressand and regressors. When the appropriate variables are omitted from a model, the OLS estimators of the variables retained in the model are biased and inconsistent. In addition to the above, the variance and standard error of these coefficients are incorrectly estimated.

As a result, including irrelevant variables in the model are also that the estimated variances tend to be larger than necessary, thereby making for less precise estimation of the parameters. That is, the confidence intervals tend to be larger than necessary (Gujirati, 2009). Therefore, in order to select a correct estimated model, the researcher has carried out the Ramsey-RESET Test to check on the model specification. The hypothesis of the model specification test formulated as follows;

H₀: The model is correct.

H₁: The model is incorrect.

$\alpha = 0.05$

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

Table 4.5 Result of Model Specification Test

Ramsey RESET Test

Equation: UNTITLED

Specification: NPL OPRE ROA LTDR LR LLP INF IND

GD_RATE CAR BSZ

EXR DUMMY35 DUMMY40 DUMMY10 C

Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.667866	73	0.0996
F-statistic	2.781776	(1, 73)	0.0996
Likelihood ratio	3.328458	1	0.0681

Source: E-views output

From table 4.5 above, do not reject the null hypothesis (H0) since the P-values of t-statistics, F-statistics and likelihood ratio are 0.0996, 0.996 and 0.0681 respectively; which are greater than the significant value (0.05). Therefore, it can be concluded that the model is correctly specified.

4.3. Regression Result Analysis

In this part, the regression result has been presented. The following linear regression was developed on variables considered in the model to examine determinants of the non-performing loans in Ethiopian commercial banks.

Dependent Variable: NPL

Method: Least Squares

Date: 11/10/19 Time: 02:15

Sample: 1 90

Included observations: 90

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OPRE	0.791201	0.209292	3.780367	0.0003
ROA	0.355113	0.085504	4.153161	0.0001
LTDR	2.800581	1.243331	2.252483	0.0273
LR	0.155778	0.263361	0.591499	0.5560
LLP	-0.094854	0.232815	-0.407425	0.6849
INF	-0.084359	0.040259	-2.095413	0.0396
IND	-12.59432	5.345963	-2.355856	0.0211
GD_RATE	0.376553	0.367965	1.023337	0.3095

CAR	5.348221	1.916769	2.790228	0.0067
BSZ	0.212554	0.332370	0.639510	0.5245
EXR	-0.073814	0.099340	-0.743039	0.4598
DUMMY40	19.53242	3.591240	5.438906	0.0000
DUMMY35	7.961743	3.007255	2.647512	0.0099
DUMMY10	17.27140	3.396515	5.085036	0.0000
C	-3.951270	6.452490	-0.612364	0.5422
<hr/>				
R-squared	0.685857	Mean dependent var	5.124812	
Adjusted R-squared	0.626424	S.D. dependent var	4.862123	
S.E. of regression	2.971770	Akaike info criterion	5.168700	
Sum squared resid	653.5247	Schwarz criterion	5.588133	
Log likelihood	-215.0071	Hannan-Quinn criter.	5.337761	
F-statistic	11.54010	Durbin-Watson stat	1.295290	
Prob(F-statistic)	0.000000			

$$\begin{aligned}
 NPL = & -3.95 + 0.79OP + 0.355ROA + 2.8LTD + 0.155LR \\
 & - 0.095LLP - 0.084INF - 12.6 ID + 0.376GD + 5.3CAR \\
 & + 0.212BS - 0.074ER.
 \end{aligned}$$

4.4. Discussion of banking specific factors

As it can be seen in the above regression result table; the effect of operational efficiency on the non-performing loan is positive and statistically significant at 1 percent significance level. The result of regression analysis reveals that; one unit increase in operational efficiency of the banks causes non-performing loans to increase by 0.79 units and statically significant at a 1 percent significant level. According to Berger and DeYoung (1997), the positive sign on the operational efficiency variable is an indication of that; “bad management”. The basic argument here is that low efficiency considers as a signal of poor managerial performance (bad management), poor skills in credit scoring, monitoring and controlling the borrowers after loans are issued.

With regard to income diversification; despite the absence of general consensus on the effect of income diversification on bank’s NPLs, in this study, the ratio of non-interest income to total assets which was used to measure the level of income diversification of ECBs revealed a

negative relationship with non-performing loan of commercial banks and statically significant at 5 percent significance level. The indication of the negative relationship between variables is; as the source of revenue increases (diversified), the size of NPLs would decrease. In other words, the size of NPLs tends to be lower in banks that have diversified sources of revenue (income other than interest) than banks that are specialized in the traditional source of revenue (interest income). The result of regression analysis reveals that; 1 unit increase in income diversification causes non-performing loans to decrease by 12.6 units and statically significant at a 5 percent significance level.

The coefficient estimate of banks' financial performance (measured by the ratio of ROA) revealed positive and statistically significant at 1 percent significance level. This implies that an increase in the ratio of the bank's ROA leads to an increase in NPLs of ECBs. The finding was consistent with prior expectation and inconsistent with theory that indicated profitable banks are less engaged in risky activities as they have less pressure to create revenues and ultimately resulted with lower volume of NPLs (Kwan and Eisenbeis (1995), Berger and DeYoung (1997), Barth et al, (2002)). The result of regression analysis revealed that; 1 unit increase in the financial performance of the commercial banks causes non-performing loans to increase by 0.355 units and statically significant at a 1 percent significance level. The positive relationship between financial performance and the non-performing loan is that; as an increase in the financial performance of the firm, the lending ability of commercial banks will increase and positively affects the non-performing loan.

The coefficient sign of loan to deposit ratio shows that there is a positive relationship between banks' non-performing loans and loan to deposit ratio. Loan to deposit ratio had positive and statistically significant at 5% significant level. The finding of this study reveals that; 1 unit increase in loan to deposit causes non-performing loans to increase by 0.79 units. The finding of the study isconsistent with the findings established by (Swamy&Vighneswara, 2012), (Shingjerji, 2013). Therefore, the result implies that every one unit change increase in bank's loan to deposit ratio keeping the other thing constant has a resultant change of 0.79units on the non-performing loan in the same direction. The coefficient value loan to deposit ratio is animportant determinant of NPL in the Ethiopian banking industry since the variable is significant at a 5% significance level.

Regarding the relationship between the variable loan losses provision and non-performing loans, it is negative and insignificant. The finding of the study reveals that; a unit increase in loan provision causes the non-performing loans to decrease by 0.095 at an insignificant level. Regarding the capital adequacy ratio that determines the risk-taking behavior of banks, this study identifies statistically significant and positive and significant relationships between capital adequacy ratio and NPLs. The finding of the study reveals that; 1 unit increase in capital adequacy ratio causes non-performing loans to increase by 5.35 units. The implication of the positive relationship between two variables is that; the more capital adequacy the more the firm has the ability to absorb risks and increases in non-performing loans. The finding of this variable is consistent with Boudriga *et al.* (2009), Djiogap and Ngomsi (2012), Shingjerji (2013), Swamy (2012), Salas and Saurina (2002), Ahmad and Ariff, (2007), and Emmanuel (2014).

The last bank-specific variable is bank size; the relationship between bank size and the non-performing loan is positive and insignificant. The result of regression analysis reveals that; 1 percent increase in bank size causes a 0.21 unit increase in a non-performing loan.

4.6 Discussion of Macroeconomic variables

With regard to economic growth; the relationship is positive but there is no statistically significant relationship between GDP and the level of NPL and this can be evidenced from the result of regression analysis. The finding of the study reveals that; a unit increase of the economic growth causes non-performing loans to increase by 0.376 units. The finding of the study is consistent with Swamy (2012). The argument for the positive relationship between the variables is that the improvement in our real economy, within the period under consideration was substantial enough to lead to a reduction in the NPLs. This may be due to the fact that credit facilities obtained from the banks were properly utilized in productive activities.

Inflation is another variable that is considered under this study, 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. In this study, the coefficient estimate of inflation was negative

and statistically significant at 5% significant level. The finding of the study reveals that; a unit increase in the inflation rate causes non-performing loans to decrease by 0.084 units. 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).

The relationship between the exchange rate and NPL is negative. The result of regression analysis reveals that: one unit increase in devaluation causes non-performing loans to decrease by 0.074 units but, the effect of the exchange rate on non-performing loans is statically insignificant. The negative relationship is an implication of the debt-servicing capacity of borrowers who borrow in foreign currency(import-oriented firms) negatively affected by one unit change in the exchange rate. With regard to the lending interest rate; it has a positive relationship with non-performing loans but statically insignificant. The result reveals that; 1 unit increase in the lending interest rate causes non-performing loans to increase by 0.155 units.

Besides, the value of R-square and adjusted R-square is 0.685 and 0.626 respectively. This indicates, 68.5 percent of the change in independent variables explains the change in the dependent variable. This means, operational efficiency, financial performance, loan to deposit ratio, capital adequacy, bank size, lending rate, exchange rate, economic growth and inflation rate, collectively explain 68.5 percent of change in the non-performing loan. While, the remaining 31.5 percent of the variation change independent variable will be explained by other independent variables which are not included in this study; the adjusted R-squared which is an indication of a goodness of fit, In comparison to the R Square (Brooks, 2002), is used in this study to discuss the explaining power of independent variables. Because, the adjusted R square is better and more precise goodness of fit measurement, since, it allows the degree of freedom to the sum of squares.

CHAPTER FIVE

SUMMARY OF MAJOR FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

INTRODUCTION

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.

5.1. Summary and Conclusion

This study is conducted to examine the determinants of non-performing loans evidenced by Ethiopian commercial banks. In doing so, some macro-economic and bank-specific variables are included in the study as a determinant of non-performing loans. The study was conducted through secondary time series data which covers 10 years of annual observation (2009-2018) by including 10 sample banks.

The study adopted the explanatory research design and quantitative research approach. In order to estimate the extent of the effects of each variable, several tests were needed to be done. Firstly, a multicollinearity test was checked through a correlation matrix; in order to see, if there was an issue between variables. Then, other tests (such as the serial correlation, Ramsey's rest, normality, heteroscedasticity tests) were confirmed that a model is feasible. The panel data was used for the sample of ten commercial banks in Ethiopia from 2009 to 2018 and presented by using descriptive statistics and the correlation and regression analysis for nonperforming loans was conducted. The model was tested for the classical linear regression model assumptions and fulfills assumptions of the CLRM. The analyses were made in line with the stated hypotheses and specific objectives formulated in the study. In doing so, previous studies on determinants of bank's NPLs have been reviewed and as per the literature NPLs of banks " usually expressed as a function of internal and external determinants. The internal determinants refer to those factors which characterized individual banks and usually associated with the specific policy choices of a particular bank such as loan growth, financial performance, capital adequacy, loan loss provision, bank size, the quality of the loan portfolio and operational efficiency.

On the other hand, the external determinants are variables that are not related to bank management but reflect the economic, legal and surrounding natural environment that can affect the loan quality of banks. The macroeconomic factors which the literature proposes as important determinants of NPLs are annual growth in GDP, the annual inflation rate, lending interest rate and level exchange rate (ER).

The finding of the study reveals that; operational efficiency and financial performance have a positive and statically significant at a 1 percent significance level. Loan to deposit ratio, investment diversification and capital adequacy ratio was other most significant variables at a 5 percent significance level that affect the non-performing loan performance from specific banking factors. However, loan loss provision and bank size have no significant effect in determining the performance of non-performing loans in commercial banks of Ethiopia. Furthermore, from a number of macro-economic variables that affect non-performing loan; only the inflation rate affect significantly non-performing loan of commercial banks in Ethiopia. While, the effect of economic growth, exchange rate, and the lending interest rate on non-performing loans are insignificant.

5.2. Recommendations

The policy implications of this study can be summarized in the following points. In doing so, the researcher recommends to the concerned bodies; based on, the result of each variable used in this study with their respect to implication; and more emphasis is given for statically significant variables. Based on the findings of the study the following possible recommendations were forwarded:

First and for most, Loan growth, financial performance, operational efficiency, capital adequacy, income diversification, and inflation rate were the significant drivers of NPLs in Ethiopian commercial banks. Hence, by focusing on these variables the firm can reduce the probability of nonperforming loans in Ethiopian commercial banks.

With regard to operational efficiency; the banks should improve their overall cost management in a bid to generate revenue and the management of the banks shall search the better way to minimize its cost in generating revenue and this could deliberately affect the performance of NPL of banks.

The banks shall search an investment opportunity in order to diversify its source of revenue and deliberately shift its source from the traditional income (interest) to different sources of income in a bid to decrease non-performing loans of the banks. Increase in financial performance deliberate leads to increase in amount of loan and this leads to increase in non-performing loan; in this case, the bank management should strict on credit procedures and policies in proving loans and minimize the loan rate in a bid to decrease non-performing loan balance and increasing the revenue of banks by making diversified investment apart from interest.

Finally, with regard to loan growth; the expansion of credit may not be a problem by itself, but such expansion leads to poor screening and lending. Rapid credit growth contributes to lower credit standards bring higher problematic loans in the future to Ethiopian commercial banks which may be due to poor screening (Aemiro and Rafisa 2014). Also, the ECBs to hold their customers make easy the loan procedure which means provide loans for high depositors and has more transactions with familiar rather than fulfilled written loan procedure criteria. Due to the above-mentioned reasons, increase loan disbursement practice of Ethiopian commercial banks leads to an increase the volume of NPLs. Therefore, this study recommends that Ethiopian Commercial Banks balance their loan in proportion to customers' deposits.

5.3 Suggestion for future research

The study is limited to the determinants non-performing loan based on quantitative data evidenced from commercial banks of Ethiopia but further research needed to know the root-causes of the major determinants of such as Social factors like corruption practice; family /friend relationship, Political interference; Banker's inefficiency/incompetence is still needed to be explored. Additionally, the study sought to investigate the determinants of NPLs in Ethiopian commercial banks. However, the variables used in the econometrics model did not include all factors that can affect the NPLs of Ethiopian commercial banks. Thus, future research could incorporate other external factors.

REFERENCE

- ABEBE, E. (2016). *Determinants of Non-performing loans: in the case of Construction and Business Bank* (Doctoral dissertation, St. Mary's University).
- Achou, T. F., & Tenguh, N. C. (2008). Bank performance and credit risk management. *Master Degree Project, Finance Universitu of Skodve School of Technology and Society*.
- Ahmed, S. Z. (2006). An Investigation of The Relationship between Non-Performing Loans, Macroeconomic Factors, and Financial factors in Context of Private Commercial Bank in Bangladesh. *Independent University, Bangladesh*.
- Amuakwa–Mensah, F., & Boakye–Adjei, A. (2015). Determinants of non–performing loans in Ghana banking industry. *International Journal of Computational Economics and Econometrics*, 5(1), 35-54.
- AregaSeyoum, Hanna Nigussie, TadeleTesfay. (2016). Factors Affecting Non-Performing Loans: Case Study on Development Bank of Ethiopia Central Region, *International Journal of Scientific and Research Publications*, Volume 6, Issue 5, May 2016 656 ISSN 2250- 3153. www.ijsrp.org.
- Ashenafi T/Michael. (2015). Analysis of Determinants of Nonperforming Loans (Npls) ;(A Case Study in Development Bank of Ethiopia.
- Barr, R. S., & Siems, T. F. (1997). Bank failure prediction using DEA to measure management quality. In *Interfaces in computer science and operations research* (pp. 341-365). Springer, Boston, MA.
- BEJU, M. (2016). *DETERMINANTS OF NONPERFORMING LOANS OF ETHIOPIAN COMMERCIAL BANKS* (Doctoral dissertation, St. Mary's University).
- Blanco, R., & Gimeno, R. DETERMINANTS OF HOUSEHOLD DEFAULT IN SPAIN.
- Boudriga, A., Taktak, N. B., & Jellouli, S. (2009). Banking supervision and nonperforming loans: a cross-country analysis. *Journal of financial economic policy*.

BWOMA, L. (2017). *ASSESSMENT OF THE DETERMINANTS OF NON-PERFORMING LOANS AND THEIR EFFECTS ON PERFORMANCE OF COMMERCIAL BANKS IN KENYA A CASE OF SELECTED BANKS IN KISII TOWN* (Doctoral dissertation, KISII UNIVERSITY).

Basu, S2003, „Why do Banks Fail?“, *International Review of Applied Economics*, Vol. 17, pp. 231-248

Brooks, C 2008, *Introductory Econometrics for Finance*, 2nd edn, Cambridge University Press, New York

Brooks, C 2014, *Introductory Econometrics for Finance*, 2nd edn, Cambridge University Press, New York

Bolt, W., Tieman, A. F. (2004). Banking Competition, Risk and Regulation. International Monetary Fund Working Paper WP/04/11.

Boudriga Abdelkader ,Boulila T. Neila and Jellouli Sana (2009). Bank Specific, Business and Institutional, Environment Determinants of Nonperforming Loans: Evidence from MENA Countries, *Journal of Financial Economic Policy*, Vol. 1, No. 4, Pp. 286-318

Breuer, JB2006, „Problem bank loans, conflicts of interest and institutions“, *Journal of Financial Stability*, Vol.2, No.3, pp. 226–285.

Calice, P., Chando, V. M., & Sekioua, S. (2012). Bank financing to small and medium enterprises in East Africa: findings of a survey in Kenya, Tanzania, Uganda and Zambia.

Carletti, E., De Marco, F., Ioannidou, V., & Sette, E. (2019). Banks as Patient Lenders: Evidence from a Tax Reform. *Available at SSRN 3179491*.

Caprio, G & Kilngiel, D2002, „Episodes of Systemic and Borderline Financial Crisis“, World Bank (Unpublished)

Castro, V 2012, „Macroeconomic determinants of the credit risk in the banking system: The case of the GIPSI“, University of Coimbra and NIPE, Portugal.

Daniel, K., & Wandera, M. (2013). Effects of credit information sharing on non-performing loans. *European Scientific Journal*, 9(13), 168-93.

- Ekanayake, E. M. N. N., & Azeez, A. A. (2015). Determinants of non-performing loans in licensed commercial banks: Evidence from Sri Lanka. *Asian Economic and Financial Review*, 5(6), 868.
- El-Maude, J. G., Abdul-Rahman, A., & Ibrahim, M. (2017). Determinants of non-performing loans in Nigeria's deposit money banks. *Archives of Business Research*, 5(1), 74-88.
- Fernandez de Lis, S., Martinez Pagés, J., Saurina, J. (2000). Credit Growth, Problem Loans and Credit Risk Provisioning in Spain. Banco de Espana, Working Paper 18.
- Figlewski, S., Frydman, H., Liang, W. (2012). Modelling the Effect of Macroeconomic Factors on Corporate Default and Credit Rating Transitions. *International Review of Economics and Finance*, 21(1), 87–105, <http://dx.doi.org/10.1016/j.iref.2011.05.004>
- Fukuda, T., Dahalan, J. (2012). Finance - Growth-Crisis Nexus in Asian Emerging Economies: Evidence from VECM and ADRDL Assessment. *International Journal of Economic Sciences and Applied Research*, 5(2), 69–100. Available at: http://ijbesar.teiimt.gr/docs/volume5_issue2/finance_growth_crisis.pdf
- Gezu, G. (2014). *Determinants of nonperforming loans: Empirical study in case of commercial banks in Ethiopia* (Doctoral dissertation).
- HabtamuNegussieAyele., (2012). Determinants of Bank Profitability: An Empirical Study on Ethiopian Private Commercial Banks.
- IMF (2010). Determinations of NPL in Developing countries: working paper, 6, Issue 5, May 2010 436 ISSN 2250- 123 Institutions. *Inzinerineekonomika- Journal of Engineering Economics*, Vol. 23, No. 5, pp. 496-504.
- Jeong, S., Jung, H. (2013). Bank Wholesale Funding and Credit Procyclicality: Evidence from Korea. *Pano-economicus*, 60(5), 615–631, <http://dx.doi.org/10.2298/pan1305615j>.
- Jovovic, J. (2014). Determinants of Non-Performing Loans: Econometric Evidence Based on 25 Countries. Master Thesis, City University London.
- Keeton, W., Morison, C., S. (1987). Why Do Banks' Loan Losses Differ? *Federal Reserve Bank of Kansas City Economic Review*, 72(5), 3–21.

Kolapo, T. F., Ayeni, R. K., & Oke, M. O. (2012). CREDIT RISK AND COMMERCIAL BANKS' PERFORMANCE IN NIGERIA: A PANEL MODEL APPROACH. *Australian journal of business and management research*, 2(2), 31.

Lis, F. S., Pagés, M., Saurina, J. (2000). Credit Growth, Problem Loans and Credit Risk Provisioning in Spain. Banco de Espana Working Paper 18.

Louzis, D. P., Vouldis, A. T., & Metaxas, V. L. (2012). Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios. *Journal of Banking & Finance*, 36(4), 1012-1027.

Louzis D. P., Vouldis, A. T., Metaxas, V. L. (2012). Macroeconomic and bank specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios. *Journal of Banking and Finance*, 36, 1012-1027.

Louzis, P. D., Vouldis, A. T., Metaxas, V. L. (2012). Macroeconomic and Bank-Specific Determinants of Non-Performing Loans in Greece: A Comparative Study of Mortgage, Business and Consumer Loan Portfolios. *Journal of Banking and Finance*, 36(4), 1012–1027, <http://dx.doi.org/10.1016/j.jbankfin.2011.10.012>

Lu, D., Thangavelu, S. M., Hu, Q. (2005). Biased Lending and Non-Performing Loans in China's Banking Sector. *The Journal of Development Studies*, 41(6), 1071–1091, <http://dx.doi.org/10.1080/00220380500155361>

Mac Donald, S.S. and Koch, T.W. (2006). *Management of Banking*, 6 th Edition, U.S.A: Thomson - South Western.

Machiraju, HR (2001). *Modern Commercial Banking, India*: VIKAS Publishing House Pvt. Ltd. Co.

Makri, V., Papadatos, K. (2014). How Accounting Information and Macroeconomic Environment Determine Credit Risk, Evidence from Greece. *International Journal of Economic Sciences and Applied Research*, 7(1), 129–143. Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2445745.

- Manove, M., Padilla, J., A., Pagano, M. (2001). Collateral versus Project Screening: A Model of Lazy Banks. *RAND Journal of Economics*, 32(4), 726–744, <http://dx.doi.org/10.2307/2696390>
- MesayTamiru (2017). Determinant of Non-Performing Loan: In Ethiopian Private Commercial Banks: With Emphasis On Manufacturing Sector, (MSC) IN ACCOUNTING AND FINANCE
- Mileris R. (2012). Macroeconomic Determinants of Loan Portfolio Credit Risk in Banks,
- Mileris, R. (2012). Macroeconomic Determinants of Loan Portfolio Credit Risk in Banks. *IzerineEkonomika-Engineering Economics*, 23(5), 496–504, <http://dx.doi.org/10.5755/j01>. ee.23.5.1890
- Moinescu, G. B. (2012). Determinants of Nonperforming Loans in Central and Eastern European Countries: Macroeconomic Indicators and Credit Discipline. *Review of Economic and Business Studies*, 5(2), 47–58.
- Monicah W AnjruMuriithi, (2013). The Causes of Non-Performing Loans in Commercial Bank in Kenya.
- National bank of Ethiopia (20017/18). Annual report, National Bank of Ethiopia, Addis Ababa,
- Ethiopia Nkusu M (2018). Nonperforming Loans and Macro Financial Vulnerabilities in Advanced Economies, IMF Working Paper No 11/16.
- Negera, W. (2012). Determinants of NPL in Ethiopian Banks. *MBA Graduation paper, University of South Africa*.
- Nkusu, M. (2011). Nonperforming Loans and Macrofinancial Vulnerabilities in Advanced Economies. IMF Working Paper 161.
- Pain, D. (2003). The Provisioning Experience if the Major UK Banks: A Small Panel Investigation. Bank of England. Work Paper No. 177.
- Rajan R and Dhal, T. (2003). Non-performing loans and terms of credit of public sector banks in India: An empirical assessment, Reserve Bank of India Occasional Papers, Vol. 24, No. 3, pp. 81-121.

Rajaraman, I and Vasishtha, G (2002). Non-Performing Loans of PSU Banks: Some Panel Result, *Economic and Political Weekly*, pp. 429 – 435

Richard, E. (2011). Factors That Cause Non- Performing Loans in Commercial Banks in Tanzania and Strategies to Resolve Them.

Rime, B. (2001). Capital Requirements and Bank Behavior: Empirical Evidence for Switzerland. *Journal of Banking and Finance*, 25(4), 789–805, [http://dx.doi.org/10.1016/s0378-4266\(00\)00105-9](http://dx.doi.org/10.1016/s0378-4266(00)00105-9).

Petersson, J., &Wadman, I. (2004).Non-Performing Loans-the markets of Italy and Sweden.

Radivojevic, N., &Jovovic, J. (2017).Examining of determinants of non-performing loans. *Prague Economic Papers*, 26(3), 300-316.

Rajaraman, I., &Vasishtha, G. (2002). Non-performing loans of PSU banks: Some panel results. *Economic and Political weekly*, 429-435.

Rinaldi, L., &Sanchis-Arellano, A. (2018). Household debt sustainability in sub Saharan Africa: What explains household non-performing loans? An empirical analysis.(ECB Working Paper.

Rinaldi, L., Sanchis-Arellano, A. (2006). Household Debt Sustainability: What Explains Household Non-Performing Loans? An Empirical Analysis.ECB Working Paper.

Saba, I. (2018). Determinants of Non-Performing Loans: Case of US Banking Sector. *Economic*, 44(3), 81–121.

Salas, V., Saurina J. (2002). Credit Risk in Two Institutional Regimes: Spanish Commercial and Savings Banks. *Journal of Financial Services Research*, 22(3), 203–224, <http://dx.doi.org/10.1023/a:1019781109676>

Swamy, V. (2012).Impact of macroeconomic and endogenous factors on non performing bank assets. *Available at SSRN 2060753*.

Skarica, B. (2013). Determinants of Non-Performing Loans in Central and Eastern European Countries.Working Paper.

Stakic, N., (2014). Determinant kretanja nivoa problematičnih kredita u bankarskom sektoru u Srbiji. (Determinants of the Nonperforming Loans Level Movement in the Banking Sector of Serbia) *Bankarstvo*, 43(4), 122–145, <http://dx.doi.org/10.5937/bankarstvo1404122s>

Tabak, B. et al. (2005). The Stability-Concentration Relationship in the Brazilian Banking System. The Banco Central do Brazil Working Papers No. 145.

Tsige, Z. (2013). *Determinants of Non-Performing Loans: Empirical Study on Ethiopian Commercial Banks* (Doctoral dissertation, Addis Ababa University).

Wooldridge, J., M. (2009). *Introductory Econometrics: A Modern Approach*. 4th ed. Mason, Ohio: South-Western Cengage Learning.

Yetimgeta Abera (2011). The Impact of Non- Performing Loans on the Performance of Financial

Appendix 1: Result of Correlation matrix

Correlation t-Statistic Probability	NPL	OPRE	ROA	LTDR	LR	LLP	INF	IND	GD_RATE	CAR	BSZ	EXR
NPL	1.000000 ---- ----											
OPRE	0.270920 2.625151 0.0102	1.000000 ---- ----										
ROA	0.477707 5.071892 0.0000	-0.036119 -0.337115 0.7368	1.000000 ---- ----									
LTDR	0.088640 0.830045 0.4088	0.114353 1.073658 0.2859	-0.118310 -1.111331 0.2695	1.000000 ---- ----								
LR	0.380259 3.834900 0.0002	-0.043434 -0.405505 0.6861	0.456062 4.779906 0.0000	-0.149444 -1.409755 0.1622	1.000000 ---- ----							
LLP	0.401736 4.091865 0.0001	-0.012663 -0.118123 0.9062	0.706427 9.309480 0.0000	-0.076501 -0.715655 0.4761	0.243218 2.338820 0.0216	1.000000 ---- ----						
INF	-0.191335 -1.818243 0.0725	-0.153398 -1.447938 0.1512	-0.057377 -0.536062 0.5933	0.010985 0.102466 0.9186	-0.072798 -0.680820 0.4978	-0.031609 -0.294975 0.7687	1.000000 ---- ----					
IND	0.006391 0.059615 0.9526	-0.014649 -0.136656 0.8916	0.036657 0.342143 0.7331	0.072921 0.681974 0.4971	-0.004110 -0.038337 0.9695	0.024797 0.231363 0.8176	-0.073793 -0.690177 0.4919	1.000000 ---- ----				
GD_RATE	-0.075772 -0.708791 0.4803	-0.091462 -0.856696 0.3940	0.004188 0.039064 0.9689	-0.093954 -0.880235 0.3812	-0.350764 -3.493681 0.0008	0.041427 0.386734 0.6999	0.231656 2.221159 0.0289	0.075870 0.709714 0.4798	1.000000 ---- ----			
CAR	0.116145 1.090713 0.2784	0.027173 0.253545 0.8004	-0.008361 -0.077987 0.9380	0.081938 0.766842 0.4453	-0.060445 -0.564828 0.5736	-0.006062 -0.056546 0.9550	-0.041582 -0.388182 0.6988	0.722538 9.748431 0.0000	0.062778 0.586716 0.5589	1.000000 ---- ----		
BSZ	-0.296782 -2.898802 0.0047	0.112854 1.059404 0.2923	-0.332491 -3.288359 0.0015	0.037143 0.346686 0.7297	-0.212413 -2.027520 0.0457	-0.226237 -2.166368 0.0330	0.035778 0.333933 0.7392	-0.047511 -0.443651 0.6584	-0.042823 -0.399796 0.6903	-0.060190 -0.562433 0.5753	1.000000 ---- ----	
EXR	0.286953 2.794022 0.0064	-0.088920 -0.832685 0.4073	0.436697 4.527786 0.0000	-0.056311 -0.526073 0.6002	0.683132 8.725013 0.0000	0.274281 2.660348 0.0093	-0.086815 -0.812826 0.4185	-0.017279 -0.161188 0.8723	-0.334619 -3.312050 0.0014	0.033908 0.316451 0.7524	-0.200688 -1.910762 0.0593	1.000000 ---- ----

Activate Wi

Activate Wi
Go to PC setting

Appendix 2: Regression output

Dependent Variable: NPL

Method: Least Squares

Date: 11/10/19 Time: 02:15

Sample: 1 90

Included observations: 90

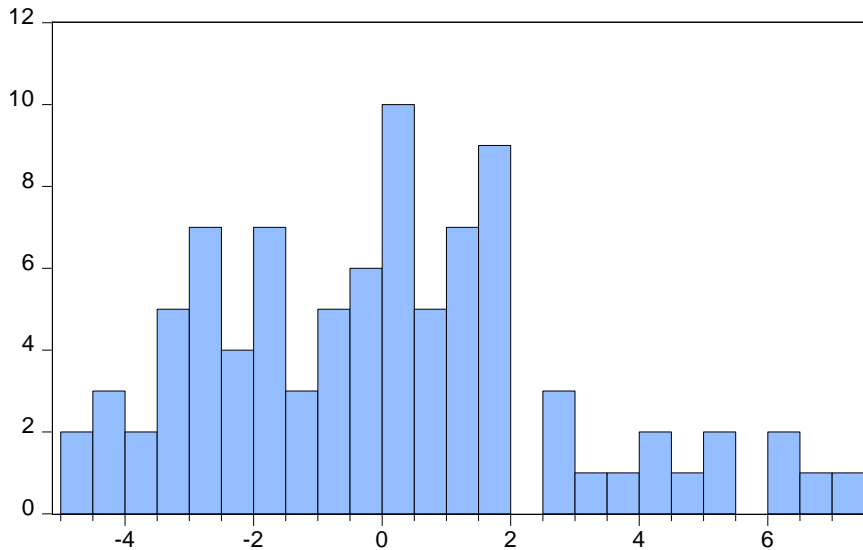
Variable	Coefficient	Std. Error	t-Statistic	Prob.
OPRE	0.791201	0.209292	3.780367	0.0003
ROA	0.355113	0.085504	4.153161	0.0001
LTDR	2.800581	1.243331	2.252483	0.0273
LR	0.155778	0.263361	0.591499	0.5560
LLP	-0.094854	0.232815	-0.407425	0.6849
INF	-0.084359	0.040259	-2.095413	0.0396
IND	-12.59432	5.345963	-2.355856	0.0211
GD_RATE	0.376553	0.367965	1.023337	0.3095
CAR	5.348221	1.916769	2.790228	0.0067
BSZ	0.212554	0.332370	0.639510	0.5245
EXR	-0.073814	0.099340	-0.743039	0.4598
DUMMY40	19.53242	3.591240	5.438906	0.0000
DUMMY35	7.961743	3.007255	2.647512	0.0099
DUMMY10	17.27140	3.396515	5.085036	0.0000
C	-3.951270	6.452490	-0.612364	0.5422
R-squared	0.685857	Mean dependent var	5.124812	
Adjusted R-squared	0.626424	S.D. dependent var	4.862123	
S.E. of regression	2.971770	Akaike info criterion	5.168700	
Sum squared resid	653.5247	Schwarz criterion	5.588133	
Log likelihood	-215.0071	Hannan-Quinn criter.	5.337761	
F-statistic	11.54010	Durbin-Watson stat	1.295290	
Prob(F-statistic)	0.000000			

Appendix 3: Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.914378	Prob. F(14,74)	0.5474
Obs*R-squared	13.12555	Prob. Chi-Square(14)	0.5167
Scaled explained SS	8.783997	Prob. Chi-Square(14)	0.8446

Appendix 4: Normality test result



Series: Residuals	
Sample 1 90	
Observations 89	
Mean	-5.74e-16
Median	-2.66e-15
Maximum	7.153913
Minimum	-4.832856
Std. Dev.	2.725145
Skewness	0.500802
Kurtosis	2.936070
Jarque-Bera	3.735394
Probability	0.154479

Appendix 5: Ramsey Reset test result

Ramsey RESET Test

Equation: UNTITLED

Specification: NPL OPRE ROA LTDR LR LLP INF IND

GD_RATE CAR BSZ

EXR DUMMY35 DUMMY40 DUMMY10 C

Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	1.667866	73	0.0996
F-statistic	2.781776	(1, 73)	0.0996
Likelihood ratio	3.328458	1	0.0681

Appendix 6: Auto correlation test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.073043	Prob. F(2,72)	0.9296
Obs*R-squared	0.180212	Prob. Chi-Square(2)	0.9138

Appendix 7: Raw data

COMP	YEAR	ROA	LTDR	BSZ	EXR	LR	GD rate	IND	INF	NPL	OPRE	CAR	LLP
AIB	2009	0.029	0.516	9.8532	10.4205	12.25	10.041	0.042	8.479	5.78	1.051	0.1067	0.05811
AIB	2010	0.027	0.49	9.9553	12.8909	12.25	10.567	0.042	8.134	5.47	1.288	0.1063	0.00597
AIB	2011	0.032	0.496	10.0449	16.1178	11.88	11.386	0.048	33.232	3.81	1.026	0.12	0.00135
AIB	2012	0.03	1.824	10.1181	17.2536	11.875	8.7	0.033	24.132	2.7	1.208	0.1257	0.0278
AIB	2013	0.0246	2.201	10.25	18.1947	11.88	9.821	0.0297	8.071	6.04	1.535	0.1161	0.02359
AIB	2014	0.0279	0.596	10.344	19.0748	11.88	10.347	0.037	7.377	8.66	1.451	0.1174	0.02327
AIB	2015	0.481	0.662	9.127	20.0956	11.88	10.4	0.626	10.1	7.36	1.946	2.3753	0.01769
AIB	2016	0.023	0.666	10.493	21.1059	12.75	8	0.0289	7.3	9.56	2.2225	0.1263	0.0154
AIB	2017	23.77	0.227	7.602	22.4137	12.75	10.9	0.0709	9.9	12.02	0.236	0.1355	0.3878
AIB	2018	0.027	0.195	7.742	27.6269	18.5	9	0.071	12.7	18.39	0.003	0.1175	0.2982
DB	2009	0.025	0.548	9.98	10.4205	12.25	10.041	0.0329	8.479	7.39	0.89	0.0933	0.00049
DB	2010	0.026	0.486	10.091	12.8909	12.25	10.567	0.0389	8.134	3	0.9534	0.0909	0.021
DB	2011	0.03	0.514	10.16	16.1178	11.88	11.386	0.046	33.232	3.38	0.8321	0.0952	0.02
DB	2012	0.034	0.565	10.243	17.2536	11.875	8.7	0.0472	24.132	2.15	0.766	0.1043	0.0211
DB	2013	0.03	0.546	10.295	18.1947	11.88	9.821	0.0403	8.071	2.25	1.023	0.1035	0.0213
DB	2014	0.032	0.533	10.341	19.0748	11.88	10.347	0.0457	7.377	5.89	1.38	0.1182	0.01779
DB	2015	0.029	0.571	10.39	20.0956	11.88	10.4	0.0444	10.1	5.95	1.596	0.118	0.01597
DB	2016	0.025	0.548	10.456	21.1059	12.75	8	0.0423	7.3	6.21	1.927	0.1175	0.01684
DB	2017	0.021	0.637	10.539	22.4137	12.75	10.9	0.0388	9.9	6.72	2.07	0.1153	0.00743
DB	2018	20.45	0.1951	7.742	27.6269	18.5	9	0.071	12.7	7.44	0.003	0.1175	0.2982
NIB	2009	0.032	0.642	9.681	10.4205	12.25	10.041	0.0358	8.479	11.16	0.596	0.1516	0.0482
NIB	2010	0.033	0.592	9.77	12.8909	12.25	10.567	0.0486	8.134	7.37	0.603	0.1535	0.04
NIB	2011	0.034	0.514	9.851	16.1178	11.88	11.386	0.0455	33.232	5.04	0.559	0.1646	0.043
NIB	2012	0.034	0.618	9.917	17.2536	11.875	8.7	0.0393	24.132	3	0.6101	0.184	0.0278
NIB	2013	0.031	0.6655	9.961	18.1947	11.88	9.821	0.0306	8.071	0.3	0.777	0.1821	0.0256
NIB	2014	0.029	0.6825	10.031	19.0748	11.88	10.347	0.075	7.377	6.73	1.162	0.1827	0.0214
NIB	2015	0.025	0.7053	10.12	20.0956	11.88	10.4	0.0685	10.1	5.56	1.273	0.1642	0.01525
NIB	2016	0.02	0.6046	10.199	21.1059	12.75	8	0.0656	7.3	8.47	1.567	0.159	0.0179
NIB	2017	0.024	0.65	10.32	22.4137	12.75	10.9	0.0674	9.9	11.22	1.272	0.14	0.0165
NIB	2018	0.03	0.8234	9.562	27.6269	18.5	9	0.0867	12.7	8.77	0.5117	0.1638	0.0393
BOA	2009	0.0039	0.7379	9.63	10.4205	12.25	10.041	0.0594	8.479	14.75	13.937	0.0983	0.05562
BOA	2010	0.018	0.5435	9.738	12.8909	12.25	10.567	0.0235	8.134	6.98	1.468	0.0948	0.0064
BOA	2011	0.02	0.587	10.22	16.1178	11.88	11.386	0.0318	33.232	3.97	0.0584	0.126	0.0137
BOA	2012	0.021	0.6727	10.4	17.2536	11.875	8.7	0.03116	24.132	2.6	2.4194	0.1147	0.01279
BOA	2013	0.019	0.5424	10.006	18.1947	11.88	9.821	0.0276	8.071	12.87	1.8309	0.109	0.02029
BOA	2014	0.018	0.556	10.05	19.0748	11.88	10.347	0.0247	7.377	10.54	2.098	0.1355	0.0214
BOA	2015	0.021	0.531	10.13	20.0956	11.88	10.4	0.0258	10.1	4.94	0.05	0.13247	0.0152
BOA	2016	0.022	0.587	10.22	21.1059	12.75	8	0.0318	7.3	12.4	4.0615	0.12624	0.0137
BOA	2017	19.7	0.6699	7.41	22.4137	12.75	10.9	0.0686	9.9	17.51	1.325	0.129	6.4816
BOA	2018	17.59	0.689	6.17	27.6269	18.5	9	0.0693	12.7	28.43	1.36	0.1327	7.50491
UB	2009	0.0195	0.60694	10.15	10.4205	12.25	10.041	0.066	8.479	4.62	0.5851	0.1174	0.01237
UB	2010	0.0234	0.5608	10.07	12.8909	12.25	10.567	0.0273	8.134	3.76	0.419054	0.132	0.00089
UB	2011	0.03	0.55	9.88	16.1178	11.88	11.386	0.036	33.232	3.35	0.5301	0.116	0.00211
UB	2012	0.033	0.6033	9.94	17.2536	11.875	8.7	0.034	24.132	2.33	0.599	0.125	0.00146

UB	2013	0.028	0.6005	9.99	18.1947	11.88	9.821	0.0304	8.071	0.33	0.41	0.12	0.00096
UB	2014	0.0234	0.56	10.07	19.0748	11.88	10.347	0.064	7.377	3.98	0.637	0.132	0.00089
UB	2015	0.0195	0.606	10.15	20.0956	11.88	10.4	0.026	10.1	4.59	2.05	0.117	0.00159
UB	2016	0.0196	0.646	10.23	21.1059	12.75	8	0.0606	7.3	4.18	0.86	0.032	0.00321
UB	2017	17.66	0.72	7.34	22.4137	12.75	10.9	0.0614	9.9	8.45	2.181	0.112	0.9022
UB	2018	20.46	0.752	7.44	27.6269	18.5	9	0.065	12.7	9.9	0.0018	0.1	0.4527
WB	2009	0.026	0.558	9.7	10.4205	12.25	10.041	0.075	8.479	7.7	0.628	0.163	0.06484
WB	2010	0.029	0.62	9.75	12.8909	12.25	10.567	0.085	8.134	3.47	0.72	0.183	0.0413
WB	2011	0.04	0.484	9.906	16.1178	11.88	11.386	0.088	33.232	3.51	0.178	0.165	0.0475
WB	2012	0.04	0.64	9.921	17.2536	11.875	8.7	0.079	24.132	2.4	1.116	0.192	0.0249
WB	2013	0.024	0.64	10.016	18.1947	11.88	9.821	0.076	8.071	0.41	0.2528	0.176	0.0229
WB	2014	0.027	0.564	10.074	19.0748	11.88	10.347	0.035	7.377	8.39	0.263	0.185	0.02041
WB	2015	0.025	0.615	10.137	20.0956	11.88	10.4	0.0754	10.1	5.25	0.227	0.176	0.01606
WB	2016	0.0174	0.677	10.209	21.1059	12.75	8	0.073	7.3	4.85	0.429	0.173	0.1585
WB	2017	24.82	0.3694	7.32	22.4137	12.75	10.9	0.077	9.9	8.41	0.181	0.153	15.449
WB	2018	28.97	0.3187	15.259	27.6269	18.5	9	0.082	12.7	12.24	2.92	0.139	7.4376
CBE	2009	0.3641	0.227	10.16	10.4205	12.25	10.041	0.0389	8.479	3.66	1.651	0.1355	0.00146
CBE	2010	0.2856	0.195	10.243	12.8909	12.25	10.567	0.046	8.134	4.84	1.888	0.13247	0.00096
CBE	2011	0.2929	0.548	10.295	16.1178	11.88	11.386	0.0472	33.232	2.86	1.026	0.12624	0.00089
CBE	2012	0.2731	0.486	10.341	17.2536	11.875	8.7	0.0403	24.132	2.32	1.408	0.129	0.00159
CBE	2013	0.2929	0.514	10.39	18.1947	11.88	9.821	0.0457	8.071	3.11	1.535	0.1327	0.00321
CBE	2014	0.2591	0.565	10.456	19.0748	11.88	10.347	0.0444	7.377	3.34	1.751	0.1174	0.9022
CBE	2015	0.2298	0.546	10.539	20.0956	11.88	10.4	0.0423	10.1	4.99	1.946	0.132	0.4527
CBE	2016	0.2974	0.533	10.7589	21.1059	12.75	8	0.0388	7.3	5.33	1.864	0.116	0.06484
CBE	2017	0.2361	0.571	10.9124	22.4137	12.75	10.9	0.071	9.9	5.01	1.7921	0.125	0.0413
CBE	2018	0.1665	0.548	11.0245	27.6269	18.5	9	0.0358	12.7	4.9	1.6254	0.12	0.0475
ZB	2009	0.2731	0.79	10.1181	10.4205	12.25	10.041	0.037	8.479	0.1004	0.599	0.0244	0.00159
ZB	2010	0.0845	0.8	10.25	12.8909	12.25	10.567	0.626	8.134	0.1498	0.41	0.24	0.00321
ZB	2011	0.1875	0.61	10.344	16.1178	11.88	11.386	0.0289	33.232	0.1655	0.637	0.0225	0.9022
ZB	2012	0.0358	0.56	9.127	17.2536	11.875	8.7	0.0709	24.132	0.1857	2.05	0.0071	0.4527
ZB	2013	0.2641	0.65	10.493	18.1947	11.88	9.821	0.071	8.071	0.172	0.86	0.0083	0.06484
ZB	2014	0.2932	0.52	7.602	19.0748	11.88	10.347	0.0329	7.377	0.1934	2.181	0.0073	0.0413
ZB	2015	0.0155	0.54	7.742	20.0956	11.88	10.4	0.0389	10.1	0.1454	0.0018	0.2133	0.0475
ZB	2016	0.2498	0.24	9.98	21.1059	12.75	8	0.046	7.3	0.1912	0.628	0.04	0.0249
ZB	2017	0.1453	0.26	10.091	22.4137	12.75	10.9	0.0472	9.9	0.2128	0.72	0.102	0.0229
ZB	2018	0.3077	0.29	10.16	27.6269	18.5	9	0.0403	12.7	0.1874	0.178	0.0595	0.02041
BB	2009	0.0354	0.24	10.243	10.4205	12.25	10.041	0.0457	8.479	0.138	1.116	0.025	0.01606
BB	2010	0.2904	0.196	9.8532	12.8909	12.25	10.567	0.0444	8.134	0.1276	0.2528	0.0251	0.1585
BB	2011	0.276	0.28	9.9553	16.1178	11.88	11.386	0.0423	33.232	0.1608	0.263	0.0194	0.00321
BB	2012	0.2174	0.27	10.0449	17.2536	11.875	8.7	0.0388	24.132	0.1968	0.227	0.0739	0.9022
BB	2013	0.214	0.37	10.1181	18.1947	11.88	9.821	0.071	8.071	0.1435	0.429	0.0298	0.4527
BB	2014	0.2545	0.44	10.25	19.0748	11.88	10.347	0.0358	7.377	0.1682	0.181	0.0294	0.06484
BB	2015	0.2123	0.45	10.344	20.0956	11.88	10.4	0.0486	10.1	0.1166	2.92	0.045	0.0413
BB	2016	0.2591	0.44	9.127	21.1059	12.75	8	0.0455	7.3	0.1737	1.651	0.05	0.0475
BB	2017	0.1665	0.436	10.493	22.4137	12.75	10.9	0.0469	9.9	0.1074	1.888	0.0378	0.0458
BB	2018	0.2506	0.38	7.602	27.6269	18.5	9	0.03285	12.7	0.1321	1.7856	0.009	0.05215