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DETERMINANTS OF NON-PERFORMING LOANS IN DEVELOPMENT BANK OF ETHIOPIA MIXED APPROCH

A THESIS SUBMITTED TO SCHOOL OF GRADUATE STUDIES, ST. MARY'S UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE DEGREE OF MASTER OF PROJECT MANAGEMENT

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THE BOARD OF EXAMINERS

As members of the Examining Board of the Final M.A thesis Open Defense, we certify that we have read and evaluated the thesis prepared by Dagne Mulatu , entitled **"Determinants of Non-performing Loan in Development Bank of Ethiopia"** and recommend that it be accepted as fulfilling the thesis requirement for the degree of: Master of Art in Project Management

Dean, Graduate Studies	**Signature**	**Date**
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Internal Examiner	**Signature**	**Date**

DECLARATION

I hereby declare that this thesis titled **"DETERMINANTS OF NON-PERFORMING LOAN IN DEVELOPMENT BANK OF ETHIOPIA"** has been done by me and it is a record of my own research work. No part of this work has been presented in any previous application for another degree or diploma at any institution. All borrowed ideas have been properly acknowledged in the text and lists of references are provided.

Dagne Mulatu

…….

January, 2018

ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Business for examination with my approval as a university advisor.

Maru Shete (PhD and Assoc. Prof.) _____

Advisor Signature

January, 2018

DEDICATION

The result of this thesis dedicated to my wife

Menbere Kefelegn

Contents

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List of Tables and Figures

List of Figures

ACRRONYMS

ADF	Augmented Dickey Fuller Test
ADLI	Agricultural Development Lead Industrialization
AIC	Akaike Information Center
CEE	Central and Eastern Europe
DBE	Development Bank of Ethiopia
DF	Dickey Fuller
ER	Exchange Rate
FDI	Foreign Direct Investment
FDRE	Federal Democratic Republic of Ethiopia
FPE	Final Prediction Error
FIML	Full Information Maximum Likelihood
GDP	Gross Domestic Product
HQIC	Hanna-Quinn Information Criterion
IASB	International Accounting Standard Board
IMF	International Monetary Fund
IIF	Institute of International Finance
KYC	Know Your Customer
LAT	Loan Approval Team
LOG	Natural Logarithm
LRM	Linear Regression Model
M2	Money Supply
OLS	Ordinary Least Square
SBIC	Schewarz Basic Information Center
US	United States of America
VAR	Vector Autoregressive
VECM	Vector Error Correction Model

Abstract

This study aimed to investigate the explanatory power of macroeconomic and specific variables as determinants of NPLs. The study used time series data of NPLs and eight macroeconomic variables over the period of 1980-2016 and cross sectional data of NPLS and specific variables for Bank specific, borrower related and external factors. Multivariate time serious model of vector auto regressive and vector error correction model was used and Johansen approach was applied to test the explanatory power of macroeconomic variables as determinants of NPLs for the time series data and OLS model for cross sectional data. For cross sectional data collection stratified sampling technique employed to determine sample size.

The study proved significant negative association of real interest rate, DBE credit growth, and export with amount of non-performing loan in Development Bank of Ethiopia in the long run. Whereas, the variables GDP growth, foreign direct investment, and average exchange rate has a significant positive association with the amount of non-performing loan and there is negative relationship between the DBE credit growths. In addition to macroeconomic variables the specific variables such poor due diligence assessment, insufficient grace period given by the Bank for the repayment, non-credit worthy project financing, financing second hand machines, lack of proactive measurement for the sign of default, willful default, rent seeking character of borrowers, poor financial record system of borrowers, misfortune of borrower, change of policy in the economic system, unavailability labor force in the project area, saturation of demand for the product of the project, remoteness from market, and unsuitable agro-ecological condition are explanatory variables that increase or significantly impact the occurrence of NPLs projects in Development Bank of Ethiopia.

In order to minimize the impact of NPLs Development bank of Ethiopia should develop a framework to assess macroeconomic variables, internal factors and external factors for stability and soundness of the bank.

Key words: *NPLs, Macroeconomic variables, Determinants, Development Bank of Ethiopia, Co-integration, Vector Autoregressive, Error Correction Mechanism, Linear Regression Model*

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the study

Banks role in the economy of any country is very significant. They play financial intermediation function and collect money from those who have excess and lend it to others who need it for their investment. Availing credit to borrowers is one means by which Banks contribute to the growth of economies. Lending represents the heart of the Banking industry. Loans are the dominant asset and represent higher percentage of the total amount at most Banks, generate the largest share of operating income and represent the Banks greater risk exposure (Mac Donald and Koch, 2006). Moreover, its contribution to the growth of any country is huge in that they are the main intermediaries between depositors and those in need of fund for their viable projects (creditors) thereby ensure that the money available in economy is always put to good use. Every one known about the importance of financial institutions in any developed or developing economy and these financial institutions not only ease the credit flow in the economy but also enhance the productivity by revitalizing the investment (Richard, 2011).

Economic growth in any country is not possible without a sound financial sector. (Raja Raman and Visishtha, 2002). Good performance of these financial institutions is the symbol of prosperity and economic growth in any country or region and poor performance of these institutions not only hamper the economic growth and structure of the particular region but also affects the whole world (Khan and Senhadji, 2001).

In the last few decades we can see many Banking failures in all over the world. (Brownbridge and Harvey, 1998). Due to these Banking failures many Banks have been closed by regulatory authorities (Brownbridge, 1998). These banking failures negatively affect the economy in many ways, firstly these banking failures causes banking crisis by harming the Banking sector, secondly it also reduces the credit flow in the country which ultimately affects the efficiency and productivity of the business units. (Chijoriga, 1997; Brownbridge and Harvey, 1998). According to Brownbridge (1998), many empirical researches have shown that most of the time Banking failures or Banking crisis are caused by non-performing loans.

Non-performing Loans (NPLs) have gained world's intention in the last three to four decades as these increasing non-performing loans are causing Banking crisis which are turning into banking failures (Barr and Siems, 1994). Non-performing loans are one of the main reasons that cause insolvency of the financial institutions and ultimately hurt the whole economy (Hou, 2007). By considering these facts it is necessary to control non-performing loans for the economic prosperity of the community and growth in the country, otherwise the resources can be jammed by unprofitable projects and sectors which not only damages the financial stability but also the economic growth. In order to control the non-performing loans it is necessary to understand the root causes of these non-performing loans in the particular financial sector. It is important to understand the phenomena and nature of non-performing loans; it has many implications, as fewer loan losses is indicator of comparatively more secured firms of financial system, on the other hand high level of non-performing loans is an indicator of unsecure financial system and a worrying signal for Bank management and regulatory authorities, if we look into the causes of great recession 2007-2009 which damaged not only economy of USA but also economies of many countries of the world we find that nonperforming loans were one of the main causes of great recession (Adebola, etal, 2011).

As high risk loans were granted to the unqualified borrowers and these loans were secured against overestimated resources or against nothing, and when this economic boom "went ruined" those high risk loans turned into non-performing loans and as loans were given to unqualified borrowers those turned into non-performing loans, as a whole this collection of nonperforming loans irrespective of its causes was one of the main factor of great recession which not only hampered the American financial sector but also economy of the whole world (Clugston, 2009).

A non-performing loan is a loan in default or close to being to default. A loan is said to be in default when it fails to make the repayments of principal and interest specified in the loan and advance as per the agreement made between the lender and Borrower and/or has no intention of repaying in the future (Pilbeam, 1998). Many loans become non-performing after being in default for 3 months, but this can depend on the contract terms. A loan is non-performing when payments of interest and principal are past due by 90 days or more, or at least 90 days of interest payments have been capitalized, refinanced or delayed by agreement, or payments are less than 90 days overdue, but there are other good reasons to doubt that payments will be made in full. According to Vigano (1993), Non-performing loans are loans, especially mortgages that organizations lend to borrowers but do not capitalize on. In other

words the borrower cannot pay the loan back in full, or even enough for the Bank to make a profit. When this happens, the bank can either workout a new payment option, or foreclose on what collateral the borrower has provided. Either option costs the Bank money, so lenders try to avoid nonperforming loans whenever possible.

According to Timothy (1994), loans are regarded as default when they are placed on nonaccrual status or when the terms are significantly altered in a restructuring. Nonaccrual means that Banks deduct all interest on the loans that was recorded but not actually collected. Banks have traditionally stopped accruing interest when debt payments were more than 90 days past due. However, the interpretation of when loans qualified as past due varied widely. Many banks did not place loans on nonaccrual if they were brought under 90 days past due by the end of the reporting period. Moreover, Non-performing loans include loans and advances (i) that is not earning income; (ii) on which full payment can no longer be expected and payments are more than 90 days delinquent; (iii) total credits to the accounts are insufficient to cover interest charges over a three-month period; or the maturity date has passed and payment has not been made (Eastern Caribbean Central Bank, 2009).

Similarly, Asari (2011) defined Non-performing loan as defaulted loan in which banks are unable to profit from them. Generally, loan falls due if no interest has been paid within 90 days, however, different countries may have different experience in this regard. The long run relationship clearly revealed that interest rate has a significant impact on non-performing loans. Inversely, there exist insignificant relationship between inflation rate and non-performing loans. However in short run, both interest & inflation rates will not impact the non-performing loans.

According to the International Monetary Fund (IMF, 2009), a non- performing loan is any loan in which interest and principal payments are more than 90 days overdue; or more than 90 days' worth of interest has been refinanced .On the other hand the Basel Committee (2001) puts non-performing loans as loans left unpaid for a period of 90 days. Under the Ethiopian Banking business directive, non-performing loans are defined as "Loans or Advances whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with the contractual repayment terms of the loan or advances in question" National Bank of Ethiopia (NBE, 2008).

The causes for loan default vary in different countries and have a multidimensional aspect both, in developing and developed nations. 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, poor monitoring and other related macroeconomic and internal and external factors problems. Bank problems, mostly failures and financial distress have afflicted numerous banks, many of which have been closed down by regulatory authorities non-performing loans were cited as the major common problem that was faced by most Banks. According to NBE (National Bank of Ethiopia), the standard loan classifications are defined as follows:

Pass: Loans paid back on time as per the loan contract agreement and loan past due below 30 days.

Special Mention: Loans to incorporations, which may get some trouble in the repayment due to business cycle losses and loan past due greater than 30 days and less than 90 days.

Substandard: Loans whose interest or principal payments are longer than three months in arrears of lending conditions are eased. The banks make 20% provision for the unsecured portion of the loans classified as substandard and loan in arrears greater than 90 days and less than 180 days.

Doubtful: Full liquidation of outstanding debts appears doubtful and the accounts suggest that there will be a loss, the exact amount of which cannot be determined as yet. Banks make 65% provision for doubtful loans. Loan past due accounts greater than 180 days and less than three years.

Loss (Unrecoverable): Outstanding debts are regarded as not collectable, usually loans to firms which applied for legal resolution and protection under bankruptcy laws. Banks make 100% provision for loss loans and loan in arrears more than three years. Non-performing loans comprise the loans in the latter three categories, and are further differentiated according to the degree of collection difficulties.

Among the Governmental Banks of Ethiopia, Development Bank of Ethiopia (DBE) is one of the oldest Banks in the country and it accounts more than 108 years. DBE provides development finance to creditworthy borrowers and viable investment projects based on the government priory area projects by mobilizing local funds and other development loans provided by international organizations for development purpose. DBE was established in 1901 E.C and since its establishment it helps the country's economy by providing financial service to the investors. The Bank support the countries development by providing investment loans throughout the country with technical support by professional staffs without held collateral asset outside the project as we compared to other local Banks. Since from establishment of DBE, non-performing loan increased from year to year in terms of amount and in numbers of projects. In 1980 the amount of nonperforming loan was Birr 593,088.65

while in 2015/16 increased to about Birr 7,615,994,000.00 (it accounts 22.70% from the total loans). This shows that this figure increased through time and this problem affect not only the Bank performance and profitability it also affects the country economic activity largely since it finances projects that have significant impact on the country development and the sources for financing are community resources. Due to the increasing trend of the problem of nonperforming loan ratios, the countries resource jammed by ineffective /problem projects this has an impact on reduction of the government revenue in terms of profit tax, generate foreign exchange, employment creation, create forward and back ward linkage, knowledge transfer and the countries growth and transformation plan. This problem also affects the investor's profitability and Banks sustainability.

Thus, this study also conducted in order to identify and indicate macroeconomic and specific to Bank and Borrowers, and external related variables that determines nonperforming loan in DBE and to minimize/control the increasing trend of this problem.

1.2. Statement of the problem

Banks exist to provide financial intermediation services while at the same time endeavor to maximize profit and shareholders' value. Lending is considered the most important function for fund utilization of Banks. Banks major portion of their income is earned from loans and advances (Radha, 1980). It is specifically true for Development Banks since the major activities of the Development Bank is lending to large and development projects of the country. Lending is one of the main activities of a Bank and interest income constitutes the major portion of profit. In the case of the DBE, for instance, lending to manufacturing, agro-processing industries, mining or extractive industries and commercial agricultural projects constitute the major sources of its income (DBE, 2014). Despite the fact that loan is major source of Banks income and constitutes their major assets, it is risky area of the industry. Observing macroeconomic and specific issues is essential before extending loans and advances. In addition good credit risk management is one of the most critical risk management activities carried out by firms in the financial services industry. In fact of all the risks Banks face, credit risk is considered as the most lethal as bad debts would impair Banks profit. It has to be noted that credit risk arises from uncertainty in a given counterparty's ability to meet its obligations due to facing specific and macroeconomic related problems. If there is uncertainties on macroeconomic and specific to Bank and Borrowers related problems materialize, leads to deterioration of loan qualities. Deterioration in Banks' loan

quality is one of the major causes of financial insubstantiality. Past experience shows that a rapid build-up of bad loans plays a crucial role in banking crises (Detragiache, 1998, and Hermosillo, 1999). The solidity of Bank's portfolio depends on the health of its borrowers. In many countries, failed business enterprises bring down in to the Banking system performance (Alemu, 2001). A sound financial system, among other things, requires maintenance of a low level of non- performing loans which in turn facilitates the economic development of a country. High level of nonperforming loan is linked with Banks failures, financial crisis, non-creditworthy borrowers and macroeconomic problems. Failure in one Bank might lead to run on Bank which in turn has contagious impact affecting the whole Banking industry and other parts of the world. Regular monitoring of loan quality, possibly with an early warning system capable of alerting regulatory authorities of potential Bank stress, is thus essential to ensure a sound financial system and prevent systemic crises.

In Ethiopian context, the Banks in the country are required to maintain below 5% percent NPLs ratio of their non-performing loans from the total loan portfolio (NBE, 2008). While in Development Bank of Ethiopia this problem is relativity very high when compared with the set threshold or the industry average. Out of the total loan amount provided by DBE about 22.7% (it accounts about Birr 7.66 Billion Birr) of the loan is a non performing loan as of the year ended June 30, 2016 which is beyond required by the NBE regulation. This problem calls a research to investigate the determinant factors for the existence of high level of nonperforming loan.

Non-performing loan will happen in macro-economic condition of the country and/or world, borrower specific factors, Bank related problems, external and internal factors. The macro-economic factors for occurrence of non-performing loans are inflation, interest rate, GDP growth, unemployment, exchange rate fluctuation, and soon. The Borrowers related factors such as willful default, poor management system of the borrowers; loan diversion, poor knowledge of about the Business they engaged in and poor loan repayment culture are the determinant of non-performing loan. Poor credit risk management, lenient credit terms and conditions, poor customer due diligence assessment, poor appraisal, lack of proper follow-up and supervision, problem of portfolio management, incapability of performers and management of the Bank to manage the borrowers and elongated decision making process are Bank specific factors which have an impact on the occurrence loan default. On the other hand, market condition, political and economic situation; environmental factors are the external factors which contribute for increment of bad loans.

The study conducted on macroeconomic and bank specific factors to identify the determinants of NPLs of Jordanian banks using panel data regression, found among Bank specific factors, the lagged NPLs and the ratio of loans total assets were the most important factors that affect nonperforming loans positively. With respect to the macroeconomic factors, found that economic growth and inflation rate have a negative and significant effect on non-performing loans in performing loan by using bank specific factors and macro-economic variables such as lending rate, Economic growth and inflation rate (Rajha, 2016). However, different research's shows that there are Bank, borrower, and external factors which could lead to non-performing loans so that the researcher will fill this gap. In macro-economic variables he only used three variables but there are others macro-economic variables such as exchange rate fluctuation, unemployment rate, foreign direct investment and export which can determine the level of non-performing loans. There is no any study on macroeconomic determinates of nonperforming loan in DBE case. Different researches conducted on Ethiopian commercial Banks and other countries shows that there are macro and micro economic as well as borrower's related factors.

In DBE case there is study results on the specific factors for non-performing loans by using descriptive statistics (Mean, median, mode, standard deviation). Poor credit assessment and credit monitoring are the major causes for the occurrence of NPL in DBE. Credit size (includes aggressive lending, compromised integrity in approval, rapid credit growth and Bank's great risk appetite); high interest rate, poorly negotiated credit terms and lenient/lax credit terms, and elongated process of loan approval were Bank specific causes for the occurrence of nonperforming loans. On the other hand, poor credit culture of customers, lack of knowledge of borrower for the business they engaged in, willful default, loan diversion, and project management problems were identified as the major customer specific causes of NPLs (Seyoum and etal, 2016). This research couldn't accommodate the macro-economic variables and also used descriptive which have no power to make recommendation because the result of descriptive statistics result has less power to predict the future. Therefore, the researcher accommodates both specific and macro-economic variables and used inferential statistics to reach the result and recommendation.

In addition there is study in Ethiopian Commercial Banks which includes both the macro and specific variables but the studies missed some relevant variables. Therefore, this research will try to accommodate the relevant macro and Bank and Borrower Related specific factors as well external

variables that helps to reach more realistic results to fill the previously conducted research gap is my own interest and to inform /indicate the organization on the ways to minimize NPLs.

Based on the above listed motivations, the upward trend of non-performing loans in country in general and Development Bank of Ethiopia in particular is a cause for concern.

1.3. Research Questions (RQ)

In this research, the researcher has come out with the following research question in order to achieve the objectives set for the research.

- ✓ What are macro-economic determinants of non-performing loans?
- ✓ What are Bank specific factors for non-performing loan?
- ✓ What are the Borrowers related factors for non-performing loans?
- ✓ What are political /economic factors causing non-performing loans?
- ✓ What are markets related factors causing non-performing loan?
- ✓ What are environmental factors causing non-performing loan?
- ✓ Is there a long run relationship between macro variables with the level of nonperforming loan?
- ✓ Is there a short run relationship between macro variables with the level of nonperforming loan?
- ✓ Which factors are significant for the occurrence of non-performing loan?

1.4. Objectives of the study

1.4.1. General objective

The general objective of the study is to investigate the determinants of non-performing loans in Development Bank of Ethiopia.

1.4.2. Specific objectives

To achieve the general objective of this thesis, the researcher assesed the following specific objectives.

- ✓ To identify the macro-economic determinants /cause of nonperforming loan in Development Bank of Ethiopia,
- ✓ To identify internal factors causing non-performing loan in Development Bank of Ethiopia,
- ✓ To identify external factors causing non-performing loans in Development Bank of Ethiopia,

- ✓ To determine the short run relationship between Macro variables and NPLs,
- ✓ To determine the long run relationship between Macro variables and NPLs and
- ✓ To identify the significant factors lead to non-performing loans? Significance of the study

1.4.3. Significance of the Study

The recent global financial crisis and the subsequent recession in many developed countries have increased households' and firms' defaults, causing significant losses for Banks. This calls for regular monitoring of loan quality, possibly with an early warning system capable of alerting regulatory authorities of potential bank stress to ensure a sound financial system and prevent systemic crises. Assessing the macroeconomic issues before extending loans by Banks and prudent risk management, with a special emphasis to credit risk is pivotal. To put in place adequate credit management tools, understanding factors that contribute to the occurrence of bad loan play crucial role.

This study thus, would help Ethiopian Banks in general and Development Bank of Ethiopia (DBE) in particular to get insight on what it takes to improve their loan qualities and to examine its policy in banking supervision pertaining to ensuring asset quality Banks maintain. In addition the study would also contribute to the existing body of knowledge regarding the determinants of nonperforming loan ratios and motivate further research generally for all Banks and specifically on Development Banks.

Moreover, the study has significant to the Bank, to detect and identify the major problem of macro and micro variables to contribute for NPLs. The research will be done enable the Bank to find the right strategy to overcome the problem and the possible actions to be taken by Development Bank of Ethiopia to sustain their profitability, sustainability and support the country's economic development.

Understanding determinants of nonperforming loan will help the country to fully exploit the benefits from the Banking sector that is essential for sustainable economic growth. The outcome of this study will provide useful inputs in the formulation macroeconomic policies of the country. Understanding these helped policy makers and related bodies to take appropriate measures to minimize the possible obstacles and able to fully utilize the benefits of the sector.

1.5. Scope of the study

This study is limited to determinants of nonperforming loan in Development Bank of Ethiopia which are macro and micro variables that determine non-performing loans. The macro variables that are used in this study are:- Annual growth rate of GDP, unemployment rate, real interest rate, average inflation rate, real exchange rate, Export, foreign direct investment (FDI) and credit /loan growth in Development Bank of Ethiopia. Besides, the data used in the study covered the period of 1980 to 2016. The specific variables are the Bank related and borrowers related factors are variables included in this study. The study is conducted to look at determinants of NPLs. It is mainly focused on the bad loans, which is the loan that is unable to be paid back to the Bank by the customers.

To undertake this study in the country level of all Banks (all private and governmental Banks of in Ethiopia) is difficult to the researcher due to time and financial constraint as the result this study limited to Development Bank of Ethiopia and not included other governmental and private Bank of Ethiopia.

1.6. Limitations of the study

The study has limitation on the availability of data especially the researcher has demand to collect data during Dergue regime that helps to make data analysis by comparing the two different system of government. This is therefore, the most important limitation of the study.

1.7. Organization of the Study

This study consists of the five chapters. The first chapter concerned with providing introduction including Background about the study, statement of the problem, research questions designed to be answered by the study, the general and specific objectives that study tried to meet in the study, significance of the study and scope and delimitation of the study. The second chapter deals with review relevant literature used as supporting in meeting the research objectives. The third chapter devoted to methodology used in conducting the study such as the data sources, types data, sampling techniques, data analysis techniques, research design, method of data analysis(Qualitative or quantitative), typical statistical software used in data processing. The chapter four deal with data presentation and

interpretation and the last but not least is major findings of the study, conclusion and recommendation and at last but not included in the chapters are references, appendix and relevant attachment.

1.8. Definition of Terms

National Bank of Ethiopia (NBE):- It is the reserve or Central Bank of Ethiopia. Besides licensing and supervising Banks, insurers and other financial institutions, NBE fosters a healthy financial system and undertakes other related activities that are conducive to rapid economic Development of Ethiopia. (Proclamation No.592/2008, FDRE, 2008).

Loans and Advances: means any financial assets of a Bank arising from a direct or indirect advance or commitment to advance funds by a Bank to a person that are conditioned on the obligation of the person to repay the funds, either on a specified date or on demand, usually with interest (NBE Directive, SSB/43/008).

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

Lending: - It is the provision of resources (granting loan) by one party to another party.

Nonperforming loan ratios - loans or advances whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with the contractual repayment terms of the loan or advances are in question; or when principal and/ or interest is due and uncollected for 90 (ninety) consecutive days or more beyond the scheduled payment date or maturity (NBE Directive, SSB/43/008).

Credit risk - it is the risk that a financial contract will not be concluded according to the agreement. It is the risk that the counterparty to an asset will default.

Non-performing loan- It is a loan in default or close to being to default.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. THEORETICAL FOUNDATION OF THE STUDY

This chapter describes about the theoretical foundation, credit methodology of the Bank, Banking adverse event and credit risk management systems of the Bank. And it is organized into three sections; section one deals with general theoretical review of Banking, section two describes credit risk management system and three about non-performing loan.

2.1.1. Theoretical review of banking

This section deals about the role of Banks, lending and credit methodology of Banks.

2.1.1.1. Role of Banks

Banks role in the economy of any country is very significant. They play intermediation function and collect money from those who have excess and lend it to others who need it for their investment. Availing credit to borrowers is one means by which Banks contribute to the growth of economies. Lending represents the heart of the Banking industry. Loans are the dominant asset and represent 50-75 percent of the total amount at most Banks, generate the largest share of operating income and represent the Banks greater risk exposure (Mac Donald and Koch, 2006). Moreover, its contribution to the growth of any country is huge in that they are the main intermediaries between depositors and those in need of fund for their viable projects (creditors). There by ensure that the money available in economy is always put to good use. Therefore, managing loan in a proper way not only has positive effect on the Banks performance but also on the borrower firms and a country as a whole. Failure to manage loans, which make up the largest share of Banks assets, would likely lead to the episode of high level of non - performing loans.

2.1.1.2. Bank Lending

As per credit policy of Development Bank of Ethiopia (DBE) of 2015, main area of focus is provision of medium and long-term loans for investment projects in the Government's priority areas in line with

the Agriculture Development Led Industrialization strategy (ADLI) of the country, the Bank provides finance to encourage investment in Agriculture and Manufacturing industries preferably export focused or import substitution. In addition to this, the Bank has launched lease financing through hire purchase modality for SMEs engaged in manufacturing having paid up capital of from Birr 500,000 up to 7,500,000.00 and who needs to purchase machineries value from 1 million to 30million. Major categories of priority areas project finance and lease financing are Commercial agriculture, Agro-processing industries; and Manufacturing sector including mining or extractive industries.

2.1.1.3. Credit Methodology

Every Bank activity has its own process to extend loans and advances to its customers. In the case of DBE to provide loans it has three steps these are credit assessment, project appraisal and loan approval team to avoid the conflict of interest and used for cheek and balance of each loan provision.

Credit Assessment: The Bank accepts applications from both recruited and walk-in customers if they fulfill the Bank's loan requirements. The Customer Relationship Management Directorates /branches mainly focus on recruiting customers by attracting and persuading potential applicants using appropriate means of communication. This requires the understanding of the strategic and operational plan of the Bank and identifying the sources of such potential customers. It is also important to promote the Bank's services, offer options of model bankable projects and encourage potential investors to apply for credit. Customer Relationship Management Directorates and/or branches offices should select potential customers applying for project financing based on the eligibility criteria and checklists for customer requirements. Due diligence or Knowing your customer (KYC) assessment will be undertaken by the Bank to identify the integrity or creditworthiness of the borrower as well as the Bankability of the project itself. This is done to protect the Bank from entering into relationships with inappropriate borrowers and to check the borrower's credit worthiness. This requires knowledge of gathering and evaluating KYC information of the applicant in compliance with the due diligence assessment guidelines and formats of the DBE and the requirements of the NBE directive No SBB/46/2010

Credit appraisal: Appraisal is the comprehensive and systematic assessment of all aspects of a proposed project. After a project has been prepared, it is generally appropriate for a critical review or an independent appraisal to be conducted. This provides an opportunity to reexamine every aspect of

the project plan to assess whether the proposal is appropriate and sound before large sums are committed (DBE, 2008). Financial institutions normally make their own appraisal of projects presented to them for loans before they contribute funds for implementation of the projects. That is why project appraisal is usually seen as a major activity of lending institutions while project feasibility study is normally undertaken by project promoters/consultants. Usually, the techniques applied to appraise projects center around technical, commercial, market, managerial, organizational, and financial and possibly also economic aspects.

Credit Approval: Once loan applications for financing of development projects are received and screened for appraisal by the Customer Relationship Management Directorates/branches, the Projects Appraisal Directorates/regional appraisal teams appraises the project; it needs to be decided upon by the Loan Approval Team/regional approval teams. The loan approval team (LAT) is to make decisions on the approval or rejection of the loan. In this process, the Loan Approval Team deliberates and decides on the loan approval document to accept or reject the loan proposal. Once the loaning decision is made in the Loan approval Process/team, the case goes back to the respective Customer Relationship Management Directorate/branch for subsequent actions (DBE, 2008)

Project Supervision and Follow-up: The Bank undertakes project supervision and follow-up activities using both on-site and off-site supervision methods. The purpose of project follow-up is to ensure that the financed projects are properly implemented and operating. It also helps to provide technical assistance as and when required (DBE, 2016).

All financed projects by the Bank should, therefore, be properly followed up and full-fledged reports have to be prepared. Off-site supervisions using periodic reports from borrowers can be made as per agreements between the parties. Projects deemed unstable and non-performing loans should be followed up more frequently. Failure of the Bank sound credit assessment, appraisal, loan approval and project follow-up and supervision during implementation and operation of projects obviously contribute to happening of non-performing loans.

2.1.1.4. Banking Risks

Risk management is a regulation at the central part of any banking organization and covers all the actions that influence its risk profile. It includes identification, measurement, monitoring and

controlling risks. Risk-taking is an inherent element of banking and, indeed, profits are in part the reward for successful risk taking. On the other hand, excessive and poorly managed risk can lead to losses and thus endanger the sustainability of the Bank. Risk in a banking organization refers to the likelihood that the outcome of an occurrence could bring adverse impacts on the institution's capital, earnings or its viability. Such outcomes could either result in direct loss of earnings and erosion of capital or may result in burden of restriction on the Bank's capability to meet its business objectives and to execute its strategies successfully. It is expected to ensure that the risks that the Bank is taking are warranted. Risks are considered warranted when they are understandable, measurable, controllable and within the Bank's capacity to readily withstand adverse results. Sound risk management systems enable the Bank to take risks knowingly, reduce risks where appropriate and strive to prepare for a future, which by its nature cannot be predicted with absolute certainty (NBE, 2008).

Banks must have comprehensive risk management process (including board and senior management oversight) to identify, evaluate, monitor and control or mitigate all material risks and to assess their overall capital adequacy in relation to their risk profile. Whilst the types and degree of risks organization may be uncovered depend upon many factors such as its size, complication, business activities, and amount etc. The most common risks the bank faces, namely: Credit Risk, Liquidity Risk, Interest Rate Risk, Foreign Exchange Rate Risk and Operational Risk.

A. **Credit risk:** Credit risk is defined as the potential that a Bank's borrower or counterparty will fail to meet its obligations in accordance with agreed terms and conditions. It is the most prominent risk faced by Banks and banking systems that needs to receive management's full-fledged attention and proper administration.
B. **Liquidity risk:** Liquidity risk is the risk that a Bank cannot meet payment obligations (commitments, repayments and withdrawals, etc.) in a timely and cost effective manner. It is the inability of a Bank to raise funds in the market at a cost equivalent to that of other similar Banks or to sell assets/instruments in the market (e.g. failure to discount Treasury bill) when it needs to do so. Liquidity is important to Pay creditors, Meet unforeseen deposit withdrawals/runoffs, accommodate unexpected changes in loan demand, loan commitments and fund normal loan growth without making costly balance sheet adjustment, pursue other investment opportunities; and cover administrative and operational expenses.

Thus, banks must have adequate liquidity in order to timely serve their customers and to operate efficiently and profitably. From the definition and our explanation of the need for liquidity, we can deduce that liquidity has three components, namely, amount (sufficient fund), timeliness (as needed) and cost (at a reasonable cost or in the most cost-efficient way possible).The purpose of liquidity management is to ensure that every bank is able to meet fully its contractual commitments. The ability to fund increases in assets and meet obligations as they become due is critical to the ongoing viability of any Bank. Therefore, managing liquidity is among the most important activities conducted by Banks (NBE, 2008)

C. **Operational risk:** Operational risk is the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and system or from external events or catastrophes. Operational risk is associated with human error, system failures and inadequate procedures and controls.
D. **Currency risk:** Foreign exchange (currency) risk is the risk of loss due to changes in the value of foreign currencies in terms of Birr (the local currency). The potential for loss arises from the process of revaluing foreign currency position in Birr terms. When banks have an open position in a foreign currency (Where the value of asset/inflow exposures in one currency is not equal to the value of liability/outflow exposures in that currency), the process of revaluation normally will result in a gain or loss.
E. **Interest rate risk:** Interest rate risk is the exposure of Banks financial condition to adverse movements in interest rates. It arises when there is a mismatch between positions, which are subject to interest rate adjustment within a specified period. The Bank's lending, funding and investment activities give rise to interest rate risk. Exposure to this risk in Banking book primarily results from timing difference in the re-pricing of assets and liabilities, both on and off balance sheet. In the scenario of rising interest rate, when liabilities re-price faster than assets, interest spread would fall and hence profitability of the Bank would be adversely affected. Changes in interest rates affect Bank's earnings by changing their net interest income and the level of other interest sensitive income and operating expenses. Changes in interest rates also affect the underlying value of the Bank's assets, liabilities and off-balance sheet instruments because the present value of future cash flow (and in some cases, the cash flows themselves) change when interest change. Therefore, an effective risk management process that maintains interest rate risk within prudent levels is essential to the safety and soundness of the Bank.

Major portion of income for most Banks comes from interest income from loans. It is also important to note that major portion of Banks' expense is the interest paid to depositors. Thus, Banks should properly determine loan price (the interest rate chargeable on loans) and cost of funds (interest rate to depositors) so as to have positive spread that is sufficient to cover the operational cost, credit risk premium (charge that help offset the likelihood of principal and interest loss) and return on economic capital invested. The following shows a general approach to loan pricing.

Lending Rate = Cost of Fund + Operational & Overhead costs +Charge for possible loss + Return on Economic Capital Allocated. For proper pricing of their assets/loans, it is important for banks to properly price their liabilities since the net interest income, major sources of their total earnings, is the difference between what they earn on loans and advances (asset price) and what they pay to depositors (liability price).Generally, it is important to note that part of interest rate risk management entails pricing or getting a return commensurate with the risk taken.

Banks Credit Risk Management system: Risk management is a regulation at the nucleus of each banking organization and incorporates all the activities that have an effect on its risk profile. It involves launch the contexts, identification, measurement; monitoring and controlling risks. (Development Bank of Ethiopia credit risk management policy, 2008)

1. **Establishing the context:** This defines the framework which encompasses the scope of risks to be managed, the process/systems and procedures to manage risks and the roles and responsibilities of individuals involved in risk management.
2. **Risk identification:** Once the context is established, the first step in managing a potential risk is identification of risks. Risks are about events that, when triggered, cause problems. Hence, risk identification can start with the source of problems or with the problem itself. Risk identification should be a continuing process and risk should be understood at both the transaction and portfolio levels. Some examples of risk identification techniques include brainstorming, questionnaire, business study, audit and inspection, etc.
3. **Risk measurement/assessment:** Once the risks associated with a particular activity have been identified, the next step is to measure the significance of each risk. Each risk should be viewed in terms of its severity and likelihood of occurrence.

4. **Risk treatment/control:** After measuring the significance (severity and probability of occurrence) of risks, it is important to design mechanisms to mitigate their adverse effect. Strategies of risk treatment include:
   - ✓ Avoiding the risk- this is not performing an activity that carries risk;
   - ✓ Transferring the risk to another party- this is causing another party to accept the risk, typically by buying insurance policies or by hedging financial instruments;
   - ✓ Reducing the negative effect of the risk- this involves putting in place mechanisms that may reduce the severity of the loss;
   - ✓ Accepting risks- Involves accepting the loss when it occurs.
5. **Risk Monitoring and Controlling:** Results of past practice, experience and actual loss should be reviewed and evaluated to update the risk management framework accordingly. This is important to evaluate whether the previously selected risk management strategies and systems are still applicable and effective for the changing environment.

2.1.1.5. Nonperforming Loans (NPLs)

2.1.1.5.1. Theoretical Review of Non-performing Loan

Impaired loans with due payment (World Bank, 2009), loans with deteriorated quality (NBE, 2008), loans that failed to be paid in principal/interest within agreed time (NBE, 2008), failure to meet to consecutive repayments (DBE, 2008). According to the International Monetary Fund (IMF, 2009), a non- performing loan is any loan in which interest and principal payments are more than 90 days overdue; or more than 90 days' worth of interest has been refinanced .On the other hand the Basel Committee1(2001) puts non-performing loans as loans left unpaid for a period of 90 days. Under the Ethiopian banking business directive, non-performing loans are defined as "Loans or Advances whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with the contractual repayment terms of the loan or advances in question" National Bank of Ethiopia (NBE, 2008). For this study the researcher used the definition of nonperforming loan given by National Bank of Ethiopia (NBE) in 2008.

2.1.1.5.2. Criteria for NPLs recommended by banking institutions

Different financial institutions developing criteria to distinguish between performing and non-performing loan ratios and banking and financial institution have come in to provide guidance on this

issue. Some countries use quantitative criteria (e.g. number of days of overdue schedule payments). While other counties exclusively rely on qualitative norms such as availability of information about the customer's financial status, management and judgment about feature payments. To improve the ability to make comparison between banks across countries, the Institute of International Finance (IIF, 2009) report that for worldwide external reporting the following categories be used:-

Standard: - Credit sound principal and interest payments are current. Repayment difficulties are not for seen under circumstances and full payments is expected.

Watch: - Asset subject to conditions, if left on correct, could raise concerns about full payment. These require more than normal attention by credit officers.

Sub-standards: - full payment is in doubt due to in adequate protection (example, Obligor net worth or collateral) or interest or principal or both are more than 90 days overdue, these assets show underling, well- defined weakness that could lead to probable loss if not corrected and thus risk becoming impaired assets.

Doubtful: - Assets from which collection /liquidation in full is determined by Bank management to be improbable due to current condition and interest or principal both are overdue more than 180 days. Assets in these categories are considered impaired but are not yet considered total losses because some spending factors may strengthen the asset quality.

Loss: - an asset is downgraded to loss when management considers the facility to be virtually uncollectible or when interest or principle or both are overdue more than one fear. This classification may indicate that there are two cases that have to be addressed. Loans that are a complete loss and loans whose quality significantly impaired (sub-standard or doubt full) and for which taken as a group experience source that a considerable portion of the future interest or instrument payments will never be made. According to the international accounting standard board (IASB) a financial asset is impaired if its carrying amount is greater than it's estimated recoverable amount (IAS 39, par. 109).

2.1.1.5.3. Criteria for NPLs as per directive of National Bank of Ethiopia (NBE)

As per the National Bank of Ethiopia's, directives issued in relation to non-performing loans classified based on the following criteria's (NBE, 2008).

Loans and advances with per established repayment program are nonperforming when principal and or interest is due and uncollected for 90 days or more beyond the scheduled payment date or maturity.

Loans and advances that don't have a per-established repayment program shall be considered as non-performing loans when the debit remains out siding from 90 consecutive days or more beyond the scheduled payment date or maturity, the debit exceeds the borrowers approved limit from 90 consecutive days or more, interest is due and uncollected for 90 days or more. For over draft the account has been inactive for 90 consecutive days and/or deposit is insufficient to cover the interest capitalized during the period.

The entire principal balance of loans or advances outstanding exhibited the characteristics described above shall be considered nonperforming (NBE, 2002). The directive also state that Banks shall be classify a loan and advances whether such loans or advances have pre-established repayment programmers or not in to the following five categories.

Pass: loans and advances in this category are fully protected by the current financial and paying capacity of the borrowers and not subject to criticism. In general, any loan or advance or portion thereof, which is fully secured, both as to principal and interest, by cash or cash substitutes, shall be classified under this category regardless or past due status or other adverse credit factors.

Special mention: - any loan or advance past due 30 days or more, but less than 90 days. **Substandard**: - non-performing loan or advance past due 90 days or more but less than 180 day's shall at a minimum be classified substandard.

Doubtful: - non-performing loans or advance past due 180 days or more but less than 360 days shall be classified at a minimum as doubtful.

Loss: - non-performing loan or advances past due 360 or more shall be classified loss.

In general, the loan and advance which is categorized under sub-standard, doubtful and loss are subjected to non-performing loans. The Bank held provisioning of 20%, 65% and 100% for these loans respectively. Which implies that the increase in the non-performing loans directly deteriorate the financial and non-financial asset of the Bank.

2.2. EMPIRICAL LITERATURE REVIEW

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

In this section we review the existing literature so as to formulate a theoretical framework to investigate the determinants of non-performing loans in development bank of Ethiopia.

2.2.1. Related literatures in Ethiopian case

In DBE case there is study results on the specific factors for non-performing loans. Poor credit assessment and credit monitoring are the major causes for the occurrence of NPL in DBE. Credit size (includes aggressive lending, compromised integrity in approval, rapid credit growth and Bank's great risk appetite); high interest rate, poorly negotiated credit terms and lenient/lax credit terms, and elongated process of loan approval were Bank specific causes for the occurrence of nonperforming loans. On the other hand, poor credit culture of customers, lack of knowledge of borrower for the business they engaged in, willful default, loan diversion, and project management problems were identified as the major customer specific causes of NPLs (Arega Seyoum, Hanna Nigussie, & Tadele Tefay, 2016). This study tried to fill the gap in addition to this specific determinants of NPLs by accommodating the specific factors and macroeconomic variable and the data analysis method used in this study is descriptive design but the researcher used inferential statistics or econometrics model to satisfy the research objectives.

By using mixed research approach on the determinants of nonperforming loan in Ethiopian Commercial Banks, he found that fund diversion, compromised integrity, over/under Financing were the most frequently mentioned factors followed by unfair competition among Banks, willful default and macroeconomic conditions. On the other hand charging high interest rate and rapid loan growth were rated among the least factors causing occurrences of nonperforming loan ratios (Geletta, 2012).

Determinants of nonperforming loan ratios (NPLs) of Commercial Banks in Ethiopia based on panel data analysis on the time period from 2002 to 2013 by using Fixed Effect Model found that return on

equity (ROE), return on asset (ROA), capital adequacy ratio, lending rate, and effective tax rate had statistically significant effect on the level of NPLs. However, the results of fixed effect regression model revealed insignificant effect of loan to deposit ratio and inflation rate on the level of NPLs of Commercial Banks in Ethiopia for the period under consideration (Gezu, 2014). The determinants of successful loan repayment performance of borrowers by applying probit model found that educational level of the borrowers, grace period for the repayment of loan, availability of other source of income, purpose of the loan and type of labor determine successful loan repayment performance of the borrowers positively and significantly (Tadesse, 2010).

2.2.2. Empirical Evidence from Other Countries

The determinants of non-performing loan in Nigeria found that, in the long run, economic growth is negatively related to non-performing loan. On the other hand, unemployment, credit to the private sector and exchange rate exerts positive influence on nonperforming loan ratios. Whereas in the short run, credits to the private sector, exchange rate, lending rate and stock market index are the main determinants of non-performing loans.(Olayinka and Emmanuel, 2014). It is revealed that the research conducted on 25 Commercial Banks in Uganda by using panel data and multiple regression of macro-economic variables inflation rate, interest rate GDP growth rate and interest rate found that inflation rate, and GDP growth have a negative effect on nonperforming loans but statistically insignificant effect on NPLs while the effect of interest rate on NPLs is positive but insignificant (Haniifah, 2015). The researcher believes that the author, Nanteza Haniifah used limited macroeconomic variables or didn't include the relevant explanatory variables that will determine NPLs ratio and the researcher improve the study by incorporating relevant variables without ignoring the stated variables. The study on Islamic Banks in Malaysia on the determinants of non-performing loans using an ARDL approach based on the three explanatory variables such as interest rate, industrial production index and producer price index found that two long run relationship among the variables and note that interest rate has significant positive long run impact on NPLs. Industrial production index turns out with a positive but insignificant sign. This reflects the popular believe that Islamic banking system in Malaysia is not fully motivated by profit and loss mechanism, as the impact of interest rate is stronger relative to productivity. Producer price index appears to have negative and significant impact on NPLs (Adebolaa and etal, 2011**).** There is positive relationship between the GDP growth and the NPLs ratio that is in reverse to international evidence. In fact it is expected that a GDP growth will lead to a reduction of

the NPLs ratio because all subjects in one economy when getting higher incomes will be more capable to repay their debts and this will be translated into lower NPLs ratios. According to international evidence the inflation rate is negatively related with NPLs ratio even in the Albanian banking system. The result of the study shows that there is a positive relationship between the lending interest rate of fifth lag and NPLs ratio in time t. The supervisory authorities should take into account this fact when determining their monetary policies to avoid the negative effects of NPLs ratio when they decide to increase the lending interest rate. An important finding of this paper consists in the positive relationship between foreign exchange rate Euro/ALL and the NPLs ratio. This is an essential fact taking into account that more than 50% of the granted loans in the Albanian banking system are in Euro currency. For this the borrowers will be almost always exposed to the foreign exchange rate of Euro/ALL and will lead to a higher NPLs ratio (Kurti, 2016). The study conducted on the determinants of non-performing loans in the Jordanian banking sector during the period 2008-2012. The study used macroeconomic and bank specific factors to identify the determinants of NPLs of Jordanian Banks. Using panel data regression, result shows that among Bank specific factors, the lagged NPLs or NPL_{t-1} and the ratio of loans total assets were the most important factors that affect nonperforming loans positively. However, contrary to international evidence the results show that large banks are not necessarily more effective in screening loan customers when compared to their smaller counterparts. With respect to the macroeconomic factors, he found that economic growth and inflation rate have a negative and significant effect on non-performing loans (Rajhan, 2016**).**

Munib and Atiya (2011) prove that, there is long run relationship with in Nonperforming loan ratios and the macroeconomic indicators of Consumer Price Index (*CPI*), Exchange Rate (*ER*), Gross Domestic Product (*GDP*), Money Supply (*M*2) and Treasury Bill Rate (*TB*).

By using the method of panel data on Micro and Macro Determinants of Non-performing Loans, they found that, problem loans vary negatively with the growth rate of GDP, the profitability of Banks' assets and positively with the unemployment rate, the loan loss reserves to total loans and the real interest rate (Ahlem and Faith, 2013). Regarding to Credit Monitoring and NPL, Agresti (2008) stated that a sound financial system and thereby prevent systemic crises essential otherwise would lead to loan default. His survey also confirmed that 92.7 percent of the respondents indicated agreement; lack of loan follow-up was also one of the top factors rated to contribute to the occurrences of NPL by the survey and interview participants. Naturally the objective of monitoring a loan is to verify whether the

basis on which the lending decision was taken continues to hold good and to ascertain the loan funds are being properly utilized for the purpose they were granted. There is also tendency by borrowers to give more attention to repaying loans if they are properly given attention by Banks. Otherwise borrowers would be tempted to divert the fund to other purposes. Thus failing to monitor loans would lead to default (Geletta, 2012).

The factors contribute to occurrences of NPL include: fund diversion for unintended purpose, over/under financing, unfair competition among Banks, compromised integrity, willful default, inadequacy institutional competency, credit operators low level of competence, borrowers skill gap, policy environment (supervisory) among others. (Ibid: pp.25-50) Non-performing loans are dangerous not only for the economy of one country but also for the whole world as we have seen the financial crisis created by these loans in East Asian countries, America and Sub-Saharan Africa. So this is the need of the era to identify the factors responsible for non-performing loans. As researchers believe that once we identify these factors then we can make policies to prevent any future happenings of these loans (Adebola & et.al, 2011). A huge volume of non-performing loans serve as preface to financial fragility.

Regarding the economic factors causing non-performing loans in the Pakistani banking sector since 2006, all the hypothesis were accepted and correlation and regression data analysis described that Interest Rate, Energy Crisis, Unemployment, Inflation and Exchange Rate have a significant and positive relationship with the non-performing loans while GDP growth has significant negative relationship with the non-performing loans of Pakistani banking sector. Bad performance of energy sectors along with poor economic settings/conditions are the main factors causing non-performing loans in Pakistan (Muhammad & et.al, 2012). Pakistan is facing energy crisis since 2006 most of the industrial units have become sick or have been closed causing a huge volume of non-performing loans. Since 2006 most of the bad loans have been caused by these severe energy crisis in the country; energy crisis not only affect the production of the units but it also affects the debt servicing capacity of the borrower as alternative sources to produce the energy are very costly causing huge cost of production. (Ibid: pp.32-40) Unemployment is the other factor which has caused a huge volume of non-performing loans especially in the consumer financing. If a person doesn't have any source of income and even don't have money to buy his food how we can expect him to pay his loan installments in time that's why there is a huge volume of non-performing loans in the consumer sector of Pakistan. If this

unemployment problem is resolved people are given jobs and they have any source of earning it can also positively affect the demand of the products because increased unemployment in the economy also negatively affects the demand of the products of firms which ultimately affects the production/sales of the firms, this ultimately leads to decline in revenues of the firms and a fragile debt conditions. (Ibid: pp.40-67)

A research undertake study on macroeconomic and bank-specific determinants of NPLs in Greece by using dynamic panel data methods to examine the determinants of nonperforming loan ratios (NPLs) in the Greek financial sector. Based on his study found that macroeconomic variables, specifically the real GDP growth rate, the unemployment rate and the lending rates have a strong effect on the level of NPLs. Furthermore, Bank specific variables such as performance and efficiency indicators were found to possess additional explanatory power on NPLs (Dimitrios & et.al, 2010). His findings have several implications in terms of regulation and policy. Specifically, there is evidence that performance and inefficiency measures may serve as leading indicators of future problem loans. This suggests that the regulatory authorities could use these measures to detect Banks with potential NPLs increases. Moreover, regulators should place greater emphasis on risk management systems and procedures followed by banks in order to avert future financial instability (Dimitrios & et.al, 2010)

Research findings indicated that non-performing loans were caused by internal and external factors. Internal factors such as poor credit policy, weak credit analysis, poor credit monitoring, inadequate risk management and insider loans have a limited influence towards non-performing loans. The research findings highlighted that external factors namely natural disaster, government policy and the integrity of the borrower as the major factors that caused non-performing loans in Commercial Bank of Zimbabwe (Mabvure et.al, 2012). Moreover, findings indicated that there is an upward trend in non-performing loans since the adoption of multicurrency in 2009. The upward trend has been attributed to the growth in the loan book of the Bank during the period under review mainly in the agricultural and manufacturing sectors of the economy. The agricultural sector has not been performing well owing to climate changes and expensive costs related with farming in Zimbabwe. Both sectors suffer severely from the increased competition from cheap products which are being imported from Asia and South Africa thereby threatening their viability. In addition findings indicated that non-performing loans have negatively affected the performance of the Bank in terms of liquidity and profitability. It was established that an increase in non-performing loans resulted in a reduction in the company's

profitability as well as the liquidity ratio. Despite strategies put in place by management to reduce non-performing loans, problem loans continue to increase. Internal factors can be easily controlled while external factors can be a threat to the viability of projects. Banks have to be vigilant in their lending decisions so as to avoid loan losses and the accumulation of non-performing loans. Banks need to concentrate on sectors that are performing well and avoid lending to those sectors which have already recorded a significant amount of nonperforming loans. One thing to note is that these results can be generalized to the whole banking sector in Zimbabwe as almost all the banks have been affected by non-performing loans. (Ibid: pp.15-75)

Based on using the econometric analysis of the empirical determinants of NPLs presented in the paper suggests that real GDP growth was the main driver of non-performing loan ratios during the past decade. Therefore, a drop in global economic activity remains the most important risk for Bank asset quality. At the same time, asset quality in countries with specific vulnerabilities may be negatively affected by additional factors. In particular, exchange rate depreciations might lead to an increase of nonperforming loan ratios in countries with a high degree of lending in foreign currencies to unhinged borrowers (approximated by international claims which are mainly denominated in foreign currencies). According to the analysis a drop in stock prices also negatively affects bank asset quality, in particular in countries with large stock markets relative to the economy (Roland, 2013). To some extent these risks recently materialized. The depreciation of local currencies in Central, Eastern and Southeast Europe against the Swiss Franc and, to a lesser extent, against the euro has already negatively affected asset quality e.g. in Poland, Hungary and Croatia where lending in these currencies is widespread. The drop in global share prices in 2011 is also likely to negatively affect bank asset quality. For emerging economies with a lower level of capital market development and a higher exposure to exchange rates has great impact on NPLs. As regards monetary policy, the significant impact of lending interest rates on bank asset quality might be relevant for central banks not only because of its possible negative effect on financial stability but also because of systemic banking crises. (Ibid: pp.115-135).

The study presents a macro-model that explains the development of the economy, wide aggregate nonperforming loan ratio in the CESEE countries. It shows that how the development of both main aggregate demand components, i.e. domestic demand and foreign demand, can affect NPL growth. The empirical results further show a lagged effect of stock prices on NPLs. Stock indices work as leading variables for financial and economic developments that directly influence the NPL ratio, and they

might also capture other effects that are not included in the model. Stock indices might also signal a direct effect that works through the value of loan collateral. Due to the relatively limited role of stock exchange markets in CESEE compared with advanced economies, the transmission mechanism might not work via wealth effects among borrowers or via the reduced potential of financing through new equity issues (Jakubík and Thomas R., 2013). Moreover, the results confirm the conclusion by Beck and et al. (2013) that the depreciation of a local currency can have a sizeable negative impact on the quality of Banks' assets. The size of this impact depends on the share of foreign currency loans in total loans; data on this share were directly available for the countries covered in the present study and could thus be combined with the exchange rate changes to form an explanatory variable that turned out to be significant and relevant. Empirically assessed the impact of the private credit-to-GDP ratio indicator seems to be crucial for explaining the development of Banks' asset quality as has been repeatedly mentioned in some recent studies and policy discussions (Borio, 2012).

The study attempted to ascertain the determinants of NPLs in the US banking sector. The empirical results support the view that macro factors, such as, Interest rate and Real GDP per capita have association with the NPLs rate. Different studies provide different variables based on their statistical research designs. However this change depends on the situational factors which include country level factors, bank level factors and the characteristics of legal and regulatory framework (Irum et.al, 2012) Study suggests that US Banks should consider Real GDP per Capita while issuing loans. Correlation provides that Real GDP per capita has strongest (68%) relationship with NPL rate. Other variables also have significant relations of 40.7% (Interest Rate) and 28.1% (Total Loans). It is evident from the regression analysis that there is good multiple correlation (76.8%) between these variables. Coefficient of determination is 58.9%. It means that 58.9% changes in the NPLs rate can be predicted by the chosen independent variables.

The econometric analysis of the empirical determinants of NPLs study shows that the real GDP growth was the main driver of the increase of the NPL ratio during the past 5 years in CEE countries. The coefficient of the stated explanatory variable is economically large, proving that the slowdown in the economic activity has greatly affected the financial stability of the region. High levels of NPLs across the region are a crisis legacy, and as economic recovery came to the countries of the region relatively late and it can be described as weak, they are still expected to cause problems. Given that an increase in inflation rates is estimated to cause growth of the NPL ratio, it can be said that the central Banks in

the countries of the CEE region are faced with an ambiguous outcome (concerning NPLs) when trying to stimulate growth. On one hand, to support economic recovery (which would lead to a drop in NPL levels), central banks can implement expansionary monetary policy, thus, up to a certain point, increasing GDP and aggregate demand. However, this would significantly increase inflation rates, which, as it is estimated, causes NPL ratios to grow. Finally, it must be emphasized also that some of the countries of the region have very limited space for expansionary monetary policy. Slovakia is the member of euro zone, Bulgaria has currency board arrangement, and some other counties in the sample have effectively pegged exchange rates, which limits the scope of monetary policy. (Bruna, 2013) Except for economic growth, the solution to the problem of NPLs would be a proactive and cooperative approach of creditors, debtors and the regulatory system. This kind of comprehensive approach is particularly important in CEE region, given that any restructuring would help spur economic recovery, thereby also helping lift the value of collateral backing other loans. Further research would require a longer time series for non-performing loans for each country that would enable exploring country-specific determinants of NPLs. This in turn would help policy makers to get a clearer image of the steps necessary to stabilize the banking sector in the post-crisis period (Ibid: pp.56-60).

The research investigated on macroeconomic determinants of the non-performing loan indices in Spain and Italy for the period from January 2004 to March 2012. The NPL ratio was defined as the percentage of bad loans over the total loans. The macroeconomic variables were expressed as credit growth, wage, inflation, unemployment and GDP. In both Spain and Italy, the macroeconomic variables are strong determinants of the Non-performing loans. However, of the five explanatory variables used, only unemployment, wage and GDP turned out to be statistically significant. Another important finding of his paper is the influence of the lags. This research showed the strongest explanatory power to explain the NPL index when adding 6 months of lag for the Spanish economy and 12 months of lag for the Italian economy. Previous researches had found adding more than 12 to 18 months to be important for their models. Thus, under the updated time series, the bad loans are affected faster by changes in the economy. This reduction in the size of the lags could be caused by the volatility of the economy after the debt crisis. The variable credit growth has a weak explanatory power in the Spanish model and it was excluded from the Italian model after finding it to be unreliable. Unemployment is a very strong variable in both countries. The partial correlation shows a defined positive relationship for this variable with the NPL index. The analyzed data suggests that a shift in

unemployment has a faster impact on bad loans in the Spanish economy than in the Italian economy. The variable 'Wage' is also explanatory in both Spain and Italy. Although the relationship was neutral, it is statistically significant. Certainly, inflation is not an explanatory variable of the NPL index, neither in Spain nor in Italy. Several regressions suggested the inclusion of this variable in the model not to be reliable under a statistical point of view. Carlos (2012) this, however, was a surprising result, provided that several papers had shown the inflation to be significant. On the other hand, the GDP had a negative correlation for the Spanish data and a positive correlation for the Italian data. (Ibid: pp.270-289)

Real Interest Rate has a positive effect on NPL increase while nominal interest rate (NINT) has a negative impact on NPL fluctuations in addition GDP level influences negatively on bad debt level and NPL level is reduced when GDP increases, because economic growth shows the improvement of business performance. This performance improves their payment capabilities. Credit to economy is the ratio of total credit to GDP, when lending increases the probability for NPL increase is higher. When an economy has a high level of credit to economy, economic crises will make businesses suffering liquidity problems (Fiqiri et.al, 2015). The outcomes of those researches suggest that inflation rate has a negative impact on NPLs, whereas improvement in macroeconomic and financial conditions seems to have a negative impact on the level of NPLs. Regarding the impact of the global financial crisis, the results show that the crisis had a negative impact on the level of NPLs. With regard to household consumption, the outcomes point out to mixed results where this effect seems to be negative in non-petroleum countries but positive in petroleum countries, whereas increasing of government spending is associated with low level of NPLs in both groups of countries. Moreover, an increase of the aggregate debt burden has a positive impact on the level of bad loans whereas expansionary monitory policy and improvement of terms of trade in petroleum countries have a significant negative effect on NPLs but this effect is not clear in non-petroleum countries (Mahmoud et.al, 2015).

Based on the Determinants of Non-Performing Loans of firm level issues and macroeconomic measures by using the data of US banking sector from official web sources of US Federal Reserve System from 1985 to 2010 by employing correlation and regression tests they found that, the Real GDP per Capita, Inflation, and Total Loans have significant impact on the depended variable, however, values of coefficients are not much high. Banks should control and amend their credit advancement policy with respect to mentioned variables to have lower non-performing loan ratio (Irum et.al, 2012).

Based on dynamic panel data methods to examine the determinants of NPLs in the Greek Banking sector found that macroeconomic variables, specifically the real GDP growth rate, the unemployment rate, the lending rates and public debt have a strong effect on the level of NPLs. Moreover, Bank-specific variables such as performance and efficiency possess additional explanatory power when added into the baseline model (Dimitrios, 2011).

By applied the ordered probit model through collecting primary data using the responses to questionnaires from the senior management of the major commercial Banks in Turkey and Pakistan; For Turkey, they found that Government intervention (Intervention) is a major determinant of nonperforming loan ratios (NPLs**). A**lso found that loans given to insiders or insider connected companies (Loans) are a weakly significant determinant of nonperforming loan ratios. The regression results further suggest that poor assessment of credit risk (Risk) and a weak capital base influence nonperforming Bank loans. Loans are often made using personal judgment rather than special lending techniques. The empirical analysis however implies that Regulation, Practice and Quality are never significant explanatory variables for non-performing loans or asset losses. For case of Pakistan, the results show that three variables that significantly influence NPLs are communication facilities provided to the credit managers (CF), the credit manager's years of service in the Bank (YOS) and years of experience as a credit manager (YOE). Communication facilities provided to the credit managers has a negative impact on non-performing loans while credit managers' years of service and years of experience are positively correlated with non-performing bank loans. Finding, which states that credit managers' decision making during the Pakistani banking crisis was greatly influenced by external factors, such as, personal interest and political corruption (Omar, 2010).

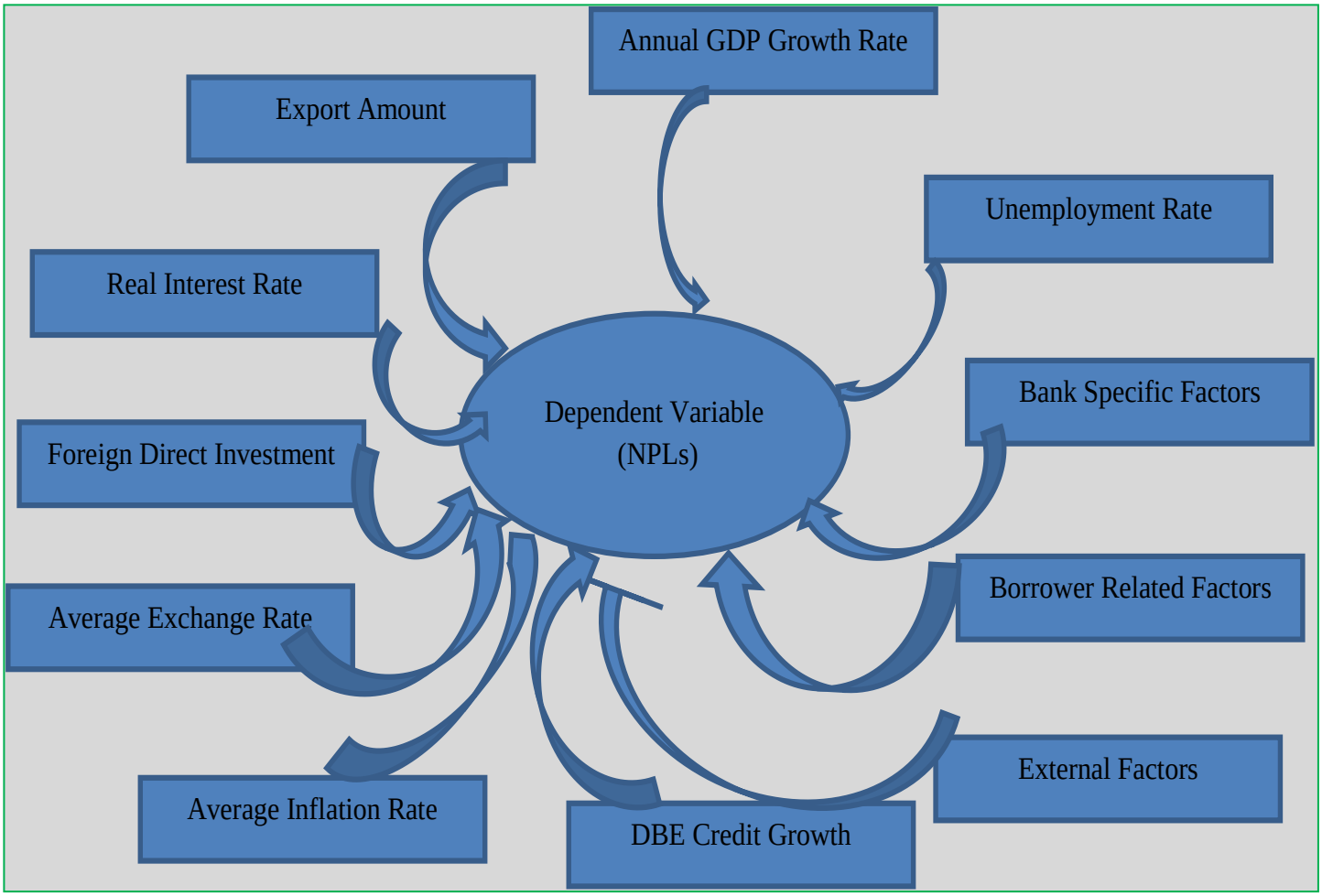
The study focused to investigate the link between NPLs and bank-specific and macroeconomic factors (period covered 1995 to 2009), and establish the extent to which these factors affect the occurrence of nonperforming loan ratios in commercial banks in Kenya. The dependent variable under his investigation was nonperforming loan ratios while independent variables included macroeconomic and bank specific factors. The macroeconomic factors included are; real GDP, GDP per capita, lending interest rates, inflation, government expenditure, export and imports, exchange rate between the Kenya shilling and US dollar and asset value as measured by the Nairobi Securities Exchange (NSE) 20 share Index. Bank specific factors included; credit risk management techniques, bank structures, and quality management factors. The study find evidence that bank specific factors contribute to NPLs

performance at higher magnitude compared with macroeconomic factors. For effective management of NPLs, it is critical for commercial Banks to understand and focus more on the management of Bank specific factors which they have more control over and seek practical and achievable solutions to redress NPLs problems (Beatrice, 2013).

From the above literature reviewed, the researcher found that some of the studies depend on the on macroeconomic variables, some others depend on Bank specific factors and some other by combining the two variables, and the others also depend on the external and internal factors. Moreover, some of the researchers use primary data, some others secondary and most of the researches use panel data and the others cross sectional data. Therefore, the researcher believes that to reach at feasible result, will try to accommodate macroeconomics and specific to Bank and borrowers related factors that determine the Non-performing Loans.

Finally the researcher after assessing other researcher's methodology, technique and gapes on the above literature reviews, will try to use mixed approach. i.e the researcher for the time series data will be used the model developed by Fawad *Ahmad and Taqadus Bashir* in the research of Explanatory Power of Macroeconomic Variables as Determinants of Non-Performing Loans by including credit growth and average real exchange rate of macro variables. In addition, the researcher will use NPLS amount as dependent variable. Moreover, in this paper used 37 years' time series data and estimated by using multivariate time sires models of VECM and VAR model. Regarding to causality test used Johansen approach test. For primary data regarding Bank and borrowers specific and external factors the researcher used cross sectional data and analyzed by using OLS model for Bank specific and Borrower related factors for the determinants non-performing loan so that the researcher has the possibility to accommodate the relevant variables that are not addressed in the previous studies.

2.2.3 Conceptual frame-work



CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Research Approach and Design

The research approach adopted by the study was quantitative since the researcher used econometrics model to reach the conclusion. Causal research design was used to show the relationship between the dependent and explanatory variables or independent variables.

3.2. Variables, Data Sources and data collection Methods

3.2.1. Explanation of Variables

Nonperforming loan is the dependent variables and Annual growth Rate of GDP, Unemployment rate, Real interest rate, Average inflation rate, Average Exchange Rate, Foreign Direct investment, Export, Credit Growth. Bank specific Variables, Borrower related factors and External Factors are independent variables.

3.2.2. Data Sources

The study used both primary and secondary sources of data. The primary data collected for cross-sectional data from the respondents of the sample representative of non-performing customers for data's related to Bank specific and borrower related as well as external variables that determine the non-performing loans and the secondary data collected for macroeconomic variables. The secondary data collected from Ministry of Finance and Economic Development, National Bank of Ethiopia, Ethiopia Revenue and Customs Authority, Central Statistics Agency, Development Bank of Ethiopia, World Bank Websites, World Bank Development Indicator and International Monetary Fund. The study period for the econometric analysis covered from 1980 to 2016.

3.2.3. Model Specification and Method of Data Analysis

3.2.3.1. Model Specification and Method of Data Analysis for time series Data (Macro-economic variables and Non-performing Loan Amount over the year

A theoretical framework is a conceptual model of how one theory makes a logical sense of the relationships among the several factors that have been identified as important to the problem. It discusses the interrelationships among the variables that are deemed to be integral to the dynamics of the situation being investigated. As discussed above, Non-performing loan the dependent variable to be explained by the explanatory variables such as, Real interest rate, Annual Growth rate of GDP, Unemployment rate, Average inflation rate, Real exchange rate, Export Amount, Foreign direct investment, Credit /loan growth of DBE are macro-economic variables that determine non-performing loan.

In addition to macro variable there is also a Bank and borrower specific as well as external factors variables which has an impact on nonperforming loan. These are capability of project appraisal, capability of credit performers, natural phenomena, availability of infrastructure, energy price, undertake poor knowing your customers (KYC) assessment by lending Banks, Borrower's educational background, Follow up /Credit management system of banks, Debit burden of the borrower ,Borrower's employee qualification, Delay in Project Implementation, Short Grace period , monitoring and evaluation and other related factors.

For the time series data different researchers in different countries used different types of model specifications like others Fawad *Ahmad and Taqadus Bashir* in the research of Explanatory Power of Macroeconomic Variables as Determinants of Non-Performing Loans Evidence from Pakistan used those variables and using time sires data of 22 years macro variables. In this research as per the recently studied researches, nonperforming loan depends on Annual growth rate of GDP, unemployment rate, real interest rate, average inflation rate, real exchange rate and foreign direct investment (FDI).

Non-performing loan function expressed as follows:-

NPLs = f (AGGDR, UR, RIR, AIR, AEX, FDI)……..3.1

The model outlined in equation (3.1) is a function that is used in many empirical works in the literature to an extent. But in this study the researcher extended the above theoretical model by including credit growth and average real exchange rate and export as additional determinants for non-performing loan. In model specification the study used Fawad *Ahmad explanatory powers of macro variables model specification from by making modifications in terms of excluding and including some macro variables.*

Nonperforming loan ratio=Amount of nonperforming loan/ Amount of total loan * 100%

NPLs = f (AGGDP, UR, RIR, AIR, AEX, FDI, AREXR, CG,)……. (3.2)

Where,

NPLs, for Non- performing loan amount over the years,

AGGDP=Annual growth Rate of GDP

UR=Unemployment rate

RIR=Real interest rate

AIR=Average inflation rate

AEX= Annual Export

FDI=Foreign direct investment

Finally the regression equation for non-performing loans in logarithm (elasticity) form is specified as:

LNPLst = B0 + βiLAGGDPt+ βiLURt + βiLRIRt + βiLAIRt+ βiLREXRt+ βiLAEXt+

BiLFDIt+ βiLCGt+ €t---------- (3.3)

Where

LNPLst, for Non- performing loans Dependent variable

LAGGDPt=Log of Annual growth Rate of GDP at time t measured in percentage

LURt= log of Unemployment rate at time t measured in percentage

LRIRt= log of Real interest rate at time t measured in percentage

LAIRt= log of Average inflation rate at time t measured in percentage

LREXRt= log of Real exchange rate at time t measured in percentage

LAEXt= log of Annual Export at time t measured in Birr

LFDIt= log of Foreign direct investment at time t measured in percentage

LCGt= log of Credit/loan growth at time t measured in percentage

€ is the error term at time t, B0 *and βi (1, 2, 3, 4,5,6,7, and 8) are parameters (coefficients) and* t is time period. To check the normality data the researcher will use unit root test to cheek stationary and non-stationary of variable before estimating/run the model. Mainly for time sires data, unit root test is mandatory to get a good result and make good inference about the study. A commonly applied formal test for the existences of a unit root in the data is the Dickey Fuller (DF) test which is a simple being the Augmented Dickey Fuller (ADF) test. The augmentation adding lagged values (p) of first different of the dependent variable as additional are required to account for possible occurrence of Dickey fuller test was applied which involves estimation testing for unit roots using equation assumes that the underlying data generating process has no intercept term and time root. After the stationary of data checked for time series data, the data analysis will be conducted by using ordinary least square more or significance test conducted in this study. To test which variables dependent or independent Granger Causality test have been used in this study. To test long run and short run relationship between the dependent variable and macro-economic variables Co-integration (Max statistics and maximum likelihood test) test and error correction model has been used respectively. For cross sectional data's or primary data collected on Bank and borrower specific as well as external factors will be analyzed by using significance T-test for the group variables and T-test for significance individual explanatory variables. For both time series data and cross sectional data the relationship between the dependent and independent correlation and regression co-efficient analysis so that both the relationship either positive and negative and significant analyzed in this study.

3.2.3.2. Model Specification and Method of Data Analysis for Cross Sectional Data

The aim of this study is to examine the determinants of NPLs of Development Bank of Ethiopia. Similar to the most noticeable previous research works conducted on the nonperforming loans of financial sectors, this study used nonperforming loans as dependent variables whereas Bank Specific factors, Borrower related factors and external factors. These variables were chosen from the empirical study sources and researcher determination of variable that have impact on the occurrence NPLS projects in Development Bank of Ethiopia. Accordingly, this study examined the determinants of NPLs of specific project of Development Bank of Ethiopia selected under this study by adopting a model that is existed in most literature. The regression model which is existed in most literature has the following general form;

$Y = \beta o + \beta X + \varepsilon$

Where: - Y is the dependent variable for firm, $\beta 0$ is the constant term, β is the coefficient of the independent variables of the study, X is the independent variable for determinant of NPLs and ε is the normal error term.

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

$RNPL = \beta 0 + \beta 1 X_1 + \beta 2 X_2 + \ldots\ldots\ldots + \beta_n x_n + \varepsilon$

Where;

RNPL= Rate of non-performing loan
β_0= an intercept
$\beta_1, \beta_{1=}$ Coefficient of Variables
X1, x2= the variables causing non-performing loans
ε represents error terms for intentionally/unintentionally omitted or added variables. It has zero mean, constant variance and non- auto correlated. The coefficients of explanatory variable were estimated by the use of ordinary least square (OLS) technique.

3.3. Population and Sampling

To collect the cross sectional or primary data the researcher used sampling since the target population was very large to undertake census survey. There are 411 projects categorized under non-performing loans as per loan classification National Bank of Ethiopia and Development Bank of Ethiopia. The data's taken from the loan position T-24 system report of the Bank as at September 30, 2017. Of which 275 projects are agricultural projects and the remaining are manufacturing projects. The researcher used two stages sampling first the sample size determined from all agricultural and manufacturing projects with 90% level of confidence. Then the projects are divided in to strata based on homogeneity and from the stratum sample taken based on the proportion of population and lastly, the respondents selected using non-probability sampling convenience sampling. The questionnaire distributed to key informants of non-performing customers and Bank contact officers who can give better response on the questionnaire.

3.4. Nature of Data and Instruments of Data collection

This study used two types of data time series and cross sectional data. For the time series data the study used secondary sources of data and collected from National Bank of Ethiopia, Development Bank of Ethiopia, Ethiopian Revenue and Custom Authority, IMF Development Indicators Report to collect trends of macro-economic variables through a structured excel format. For cross sectional data the study used both primary and secondary sources of data. The NPL project and ratio of NPLs to the total loan amount utilized collected from DBE loan position T-24 system report as of September 30, 2017 and the variables determining such NPLs projects are collected through structured questionnaires selected by taking sampled candidates.

By combining time series and cross-section observations, it gives more informative data. Accordingly, the researcher used both primary and secondary sources of data that are time series and cross sectional data. A time series data collected over 37 years starting from 1980 to 2016.

CHAPTER FOUR

4. ESTIMATION OF THE MODEL AND DATA ANALYSIS

This study has two analysis parts the first is time series data analysis and the second is cross sectional data analysis. The time series data analysis is for macro-economic variables and amount of DBE non-performing loan amount over the 37 years. The cross sectional data are the variables related to Bank specific, Borrowers related and external factors to occurrence non-performing loan. The analysis starts with time series data and then the cross sectional data analysis.

4.1. Results from Descriptive Analysis

4.1.1. Description of Time Series Data

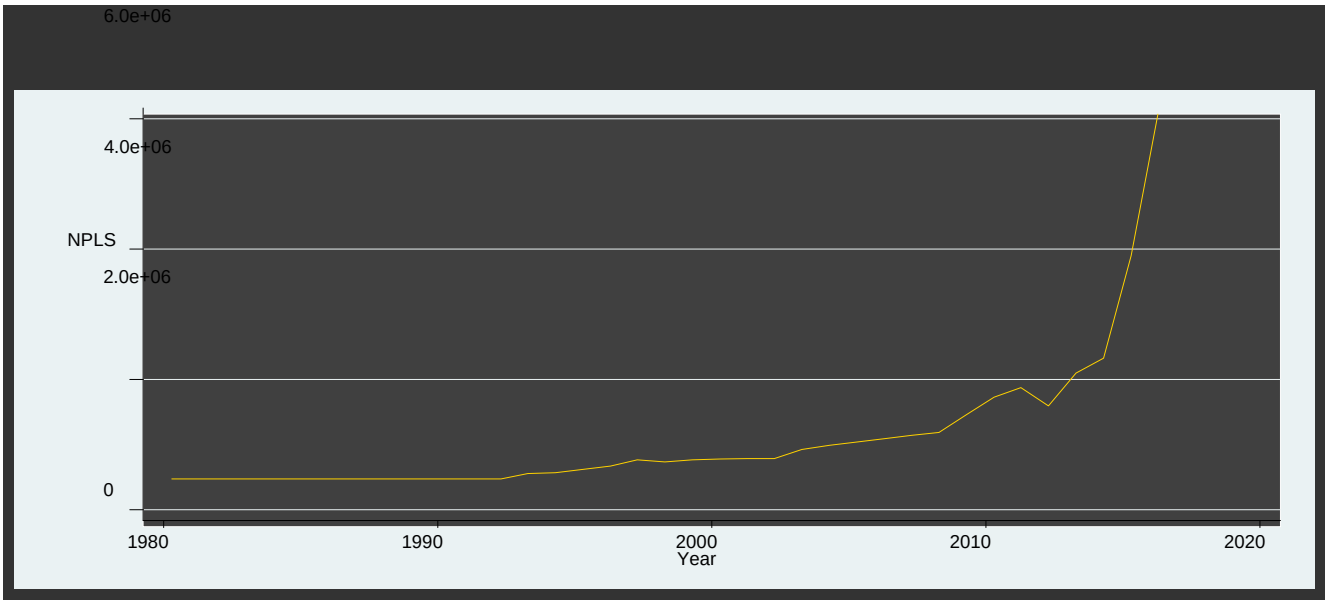
Before starting analysis it is often useful to see data properties like; minimum and maximum values, means value, standard deviation and the correlation of variables. The descriptive, statistics and correlation matrix of the variables used in benchmark model is represented as follows.

Table 4:1 Summary of Descriptive Statistics of Macro-Economic Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
lognpls	37	624845.5	1096692	59.39	5601862
logfdi	37	1.511497	1.880654	.0014763	6.091229
logrir	37	.0032243	9.924496	-27.76044	17.63548
logaexr	37	7.876546	5.975796	2.07	21.9
loggdpgr	37	5.257054	6.543774	-11.144	13.859
logur	37	24.29649	4.636114	16.2	33.34
logaiflr	37	8.802703	10.10433	-10.6	36.4
logdbecg	37	.1956542	.164778	-.1049446	.9969916
logexportm~r	37	38979.39	39475.42	4727	126886.4

Source: Authors Own Estimation, 2017

Figure 4:1 Graphical Representation of NPLs Growth over the Years



The table above shows the amount of NPLs increase over the years especially from the year 2010.

The correlation matrix shown in Table (4.2) gives approximation of the relationship between nonperforming loan ratios and its determinants. The table shows that log of nonperforming loan have a negative correlation with log of DBE credit growth, real interest rate, and unemployment rate and export. While log of NPLs is a positively correlated with log of foreign direct investment, GDP growth rate, average exchange rate, inflation rate and export amount. However, the table illustrates that the relationship between average exchange and nonperforming loan ratios is particularly strong.

Table 4:2 Correlation Matrix for the variables included in the Model

	lognpls	logfdi	logrir	logaexr	loggdpgr	logur	logaiflr	logdbecg	logexp~r
lognpls	1.0000								
logfdi	0.6060	1.0000							
logrir	-0.2608	0.0281	1.0000						
logaexr	0.8366	0.6130	-0.2311	1.0000					
loggdpgr	0.3103	0.1830	0.2227	0.4703	1.0000				
logur	-0.6720	-0.4809	0.1769	-0.7990	-0.5391	1.0000			
logaiflr	0.1544	-0.1621	-0.5027	0.2778	-0.0170	-0.3473	1.0000		
logdbecg	-0.0449	-0.2315	-0.1242	-0.0630	0.1510	0.1219	0.1077	1.0000	
logexportm~r	0.8384	0.5289	-0.2988	0.9769	0.4523	-0.8124	0.3147	-0.0256	1.0000

Source: Author Estimation, 2017

4.1.2. Description of Cross Sectional Data

This section presents the descriptive statistics of dependent and explanatory variables used in this study. The dependent variable used in this study was NPLs ratio of specific projects selected from sampling while explanatory variables are borrower specific factors, Bank related and external factors such political, economic, environmental and market. Accordingly, the annex-2 reports mean, maximum, minimum, standard deviation and number of observation for each variables used in this study.

NPLs ratio measured by amount of total outstanding divided by total loan utilized by the borrower ranges from 0.154 - 2.970552 percent. The maximum ratio of non-performing loan shows that 297% of the loan amount utilized due the borrower didn't settle interest due. It has a mean of 95.60% and showing the standard deviation (44.68%) from its mean value. This indicates that the NPL projects of Development Bank of Ethiopia incurred 95.60%NPLs on averages from their loan. According to Ethiopian context, the banking sectors are required to maintain the ratio of NPLs at least below 5% (NBE, 2008). The detail of descriptive statistics of all variables is illustrated (Refer annex 2)

Table 4:3 Categorical Descriptions of NPLs Ratio of Projects by sector

sector	mean	max	min	sd	p50
1	.9005921	2.222222	.1896154	.366301	.9325287
2	1.067502	2.970552	.154974	.5663292	.9112087
Total	.9501149	2.970552	.154974	.4386986	.9266499

Source: Authors own estimation, 2017

Where 1 = Agriculture

2= Manufacturing

From the above table we can understand manufacturing projects have more ratio of non-performing loan than agricultural projects because the above figure shows the mean, min max, standard deviation and median of manufacturing projects are above the agricultural projects

4.1.3. Test of Stationary

In any time sires data, before to proceed to estimate the model first cheek the stationary and non-stationary of variables used for the model. In order to test the presence if unit root and other properties of time series data under investigation, Augmented Dickey Fuller (ADF) test is used. Among the testing mechanism of stationary and non-stationary of variables this method is better than others to easily detect it.

4.1.4. Unit Root Test

In the case of dickey fuller test, there may create a problem of autocorrelation problem. To tackle autocorrelation problem, dickey fuller have developed a test called augmented dickey fuller test on there are three equations. This are

a) *Delta*Yt=β1+dYt-1+ai+et---------- (equation 1) intercept only*

b) *Delta*Yt=β1+β2t+dYt-1+ai+et---------- (equation 2) Trend and intercept*

*c) Delta*Yt=dYt-1+ai+et---------- (equation 3) No Trend no intercept*

Augmented Dickey - Fuller test was conducted for testing unit roots of variables. The study checked null of the unit root against the alternative hypothesis of stationary by the ADF regressions including an intercept but not a trend and with an intercept and a linear trend. Akaike information criterion (AIC) was used to determine the optimal lag length for the augmented terms. The computed absolute value of the test statistics (Dickely-Fuller statistics) was checked against the maximum values of these criteria with the 95 percent absolute critical value for the Augmented Dickey-Fuller statistic. If the computed absolute test statistic value was greater than the absolute critical value, then we rejected the null of unit root, which means stationary in the time series. On the other hand, if absolute test statistics value was less than absolute critical value then we fail to rejected null of the unit root concluding the series as non- stationary. The variable of log of Nonperforming loan (LNPLs), Real Interest Rate, GDP (Gross Domestic Product) growth rate, Average Inflation Rate and DBE credit growth was tested for stationary and found that stationary at a level by using Augmented Dickey - Fuller test. The computed absolute value for intercept, Trend model and Non- trended model are greater than 95 percent absolute critical value for the intercept, Trend model and Non- trended model are -2.93, -3.50 and -1.950 respectively which indicated that the Augmented Dickey-Fuller test statistic was above the absolute value of 95 percent critical value. Therefore, we reject the null hypothesis and accept the the alternative hypothesis.

On the other hand, the computed absolute value of the variables for intercept, Trend and non-trended model of Log FDI (Foreign Direct Investment), Average Exchange Rate, Unemployment rate and Annual Export amount were below the 95 percent absolute critical value for the Augmented Dickey Fuller statistics of -2.93, -3.50 and -1.950 respectively. This implies that these variables has unit root at a level so that we fail to reject the null hypothesis and should go to first differencing since the data should be stationary to run the regression model. And it is shown in the Augmented Dickey-Fuller statistics of Table (4.3).

Table 4.3 Unit Root Test of Variables at a Level

Variable	Intercept	Trend Model	Non-Trend Model
LNPLS	-8.188	-7.769	-8.524
LFDI	-1.458	-2.78	-0.614
LRIR	-4.107	-4.158	-4.168
LAVEXCR	3.318	-0.137	6.003
LGDGR	-4.196	-5.241	-2.933
LUR	-1.285	-3.897	-0.453
LAVIFR	-4.104	-4.483	-2.909
LDBECG	-5.609	-5.614	-2.992
LEXPORT	2.270	-0.642	4.012
Critical values	**5%=-2.93**	**5%=-3.50**	**5%= -1.95**

Source: Author Estimation, 2017

Table (4.3) result confirmed that the variables of data series the logarithm of foreign direct investment, average exchange rate, unemployment rate and export amount has a unit root meaning we fail to reject the null hypothesis or were non-stationary at level. Since these data series are non-stationary at a level, the next step was to confirm our results by checking the presences of unit root in first differences form of these data series. Data series of logarithm of nonperforming loan, real interest rate, GDP growth rate, average inflation rate and DBE credit growth are stationary at the level. Therefore we reject null hypothesis or accept the alternative hypothesis. And based on the estimation, the computed absolute value for intercept, trend and non- trended model for these variables was stationary after first differencing , which was greater than 95 percent absolute critical value -2.93, -3.50and-1.95 of the Augmented Dickey -Fuller statistics value of intercept, trend and non-trend model respectively. The Augmented Dickey -Fuller statistics of Table (4.4) shows the result of it. So these results confirmed that this data series was non stationary in its level form and became stationary after first difference and this data series was declared as *I*(1).

Data series of ΔLog FDI (Foreign Direct Investment), Average Exchange Rate, Unemployment rate and Annual Export amount were also checked in its first difference form for the existence of unit root which stated that computed absolute value for intercept, trend and non -trended model for these variables was greater than 95 percent absolute critical value for the Augmented Dickey Fuller statistic of intercept, trend and non - trended model in the Table (4.4). So these results confirmed that these data series were non stationary in its level form and became stationary after first difference as a result these data series was declared as *I* (1). The table below shows unit root test at first difference

Table 4:4Unit Root Tests of Variables at First Difference

Variable	Intercept	Trend Model	Non-Trend Model
LNPLS	-8.188	-7.769	-8.524
ΔLFDI	-4.909	-4.297	-4.820
LRIR	-4.107	-4.158	-4.168
ΔLAVEXCR	-4.909	-4.929	-4.820
LGDGR	-4.196	-5.241	-2.933
ΔLUR	-3.686	-4.882	-3.639
LAVIFR	-4.104	-4.483	-2.909
LDBECG	-5.609	-5.614	-2.992
ΔLEXPORT	-3.089	-3.954	-2.624
Critical values	**5%=-2.93**	**5%=-3.50**	**5%= -1.95**

Source, Author Estimation, 2017

Note that Δ refers to first differenced

4.1.5. Co-integration and Error Correction Model

Once the researcher tested the unit roots for the given data series, the next step was to estimate the co-integrating regression between the variables to check the long run relation between them. Two conditions must be fulfilled for the variables to be co-integrated. First, all the individual variables should be integrated of the same order and secondly the linear combination of these variables should be integrated to an order lower than the order of integration of the individual variables. The present study used the Johansen full information maximum likelihood (FIML) approach. This approach, in first step, identified the order of vector Auto Regressive (VAR) and then checked the number of co-integration vector among the series where it also produced long run elasticity's. After establishing the co-integration among the variables, the study used the error correction model (ECM) to estimate the short run elasticity's. This analysis also showed adjustment mechanism of the system to any short run shock. Lastly, Granger Causality was also estimated to check the direction of causation between the variables.

Table 4:5 Lag Order Selections

Selection-order criteria

Sample: 1982 - 2016 Number of obs = 35

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-521.741				8.8e+11	30.3281	30.4661	30.728
1	-479.472	84.539*	1	0.000	8.4e+10*	27.9698*	28.1232*	28.4142*
2	-479.379	.1846	1	0.667	8.8e+10	28.0217	28.1904	28.5105

Source: Author Own Estimation, 2017

***Denotes the selected lag order of VAR**

In the first stage of this analysis, order of VAR was identified using Schwarz basic information criterion (SBIC), Hanna-Quinn information criterion (HQIC), Akaike information criterion (AIC), and final prediction error (FPE) criteria with a maximum of their lags. In this process variables , which were include in the VAR ,were foreign direct investment, average exchange rate, unemployment rate, and annual export amount because these variables were(1) as shown earlier. As table 4.4 indicates all of the four criteria's FPE, AIC, HQIC and SBIC recommend using one lag in the system equation model that is in the Johansen test of co-integration and vector error correction.

The second step in Johansson's procedures is to test the presence and the number of co-integrating vectors among the series in the model. The rank of the co- integrating that is the number of the co-integrating vectors selected using the maximal Eigen values and the Trace value test statistics.

Table 4:6 Number of Co-integration Vector Based On Trace Statistics

Maximum Rank	Parms	LL	Eigen value	Trace statistic	Critical value
0	90	-1242.479	.	278.429	192.89
1	107	-1206.105	0.8823	205.681	156
2	122	-1175.777	0.83203	145.026	124.24
3	135	-1154.594	0.71236	102.661	94.15
4	146	-1136.561	0.65381	66.5946*	68.52
5	155	-1121.422	0.58957	36.3156	47.21
6	162	-1113.638	0.36738	20.7474	29.68
7	167	-1107.138	0.31774	7.7477	15.41
8	170	-1104.178	0.15978	1.8286	3.76
9	171	-1103.264	0.05236		

Sources: Author's own estimation, 2017

*** denotes rejection of the hypothesis at 0.05 level.**

Table 4:7 Number Co-integration Vector Based Max Statistics

Maximum rank	parms	LL	Eigen value	Max statistic	5% Critical value
0	90	-1242.479	.	72.7477	57.12
1	107	-1206.105	0.8823	60.655	51.42
2	122	-1175.777	0.83203	42.3658	45.28
3	135	-1154.594	0.71236	36.0659	39.37
4	146	-1136.561	0.65381	30.2791	33.46
5	155	-1121.422	0.58957	15.5682	27.07
6	162	-1113.638	0.36738	12.9996	20.97
7	167	-1107.138	0.31774	5.9191	14.07
8	170	-1104.178	0.15978	1.8286	3.76
9	171	-1103.264	0.05236		

Source: Author Estimation, 2017

On the basis of the results of trace statistic value of test statistic Table 4.5 the hypothesis of no co-integration was rejected and the study accepted the alternative hypothesis of existence of co-integration among the series. This suggests that there exist precisely four co-integrating vector in the estimated model. Hence, we can conclude that there is long run relationship between the variables which is explained by a linear combination of I (4) variables. Results of the trace test confirmed that, the result obtained through maximal Eigen value test and gave us three co- integrating vector because test

showed that, the value were significant at 5% level .For test statistics of the fourth statistic value for the tests was greater than the 95 percent critical value.

4.1.6. Estimates of Long Run and Error Correction Model

Co-integration analysis offers an improved method to estimate the long run dynamic relationship among time series economic variables. The Johansen method is a form of an Error correction model (ECM) and in the presences or existence of one co-integrating vector, its parameters can be interpreted as estimates of the long run co-integrating relationship among the series (Hallam and Zonoli, 1993). The concepts of co-integration and error correction modeling are closely correlated as the method brings together short run and long run information in modeling time series data through an error correction model (ECM) (Ericsson, 1992). The co-integrating, once established among the variables include in the present study, the dynamic ECM structure was then considered for analysis as it saved from the estimation of counterfeit regression among the variables and also provided information about the adjustment speed to long run equilibrium (Engle and Granger , 1987). In the estimation of an ECM for nonperforming loan, we included the same number of lags as were taken in the tests of co-integration that is one lag. The parameters from the Johansen co-integration regression were the estimates of the long run elasticity's whereas, the coefficients of the differences terms in the error correction model were the estimates of the short run elasticity's.

The variable of foreign direct investment was significant in the long run and in the short run since the t-critical value (2.064) were less than t-statics value for the long run 2.44 and short run -6.34 respectively. The direction of these variables in the long run is positive and negative in the short run as it showed positive and negative sign with the non-performing loans, its effects to the non-performing loans was elastic both in the long run and in the short run. The elasticity coefficient for this variable in the long run explained that one percent increase in the amount of foreign direct investment brought 287,133.3 increases in the non-performing loan amount in Development Bank of Ethiopia .Whereas this elasticity coefficient decreased to 682,212.9 in the short-run which indicated that one percent increase in the amount of foreign direct investment introduced 682,212.9 decrease in nonperforming loan amount however , keeping all other factors constant (See table 4.6 and 4.7). This shows that in the long run the foreign direct investment increase the non-performing loan amount in credit management of the Development Bank of Ethiopia. A relatively larger short run elasticity coefficient for non-performing loans with respects to foreign direct investment is logical since if there is high

amount foreign direct investment today affect the existence of nonperforming loan currently than in the future because in the future the economy adjusted to minimize the current non-performing loan impact than today, Due to the fact that, currently FDI has great impact on non-performing loan than in the future as compared to long run. Even though the FDI has significant impact in the short run it is in reducing the amount of the non-performing loan. However, in the long run it has positive impact meaning increase the amount non-performing loan. This is therefore, the Development Bank of Ethiopia subject to risky in the long run in foreign direct investment.

The variable of real interest rate was significant in the short run and long run since the t-critical value were less than the t-statics for the long run and short run were -2.22 and -4.18 respectively. The direction of this variable in the short run as well as in the long run was consistent as it showed positive sign with the non-performing loans, and its effect is inelastic in the long run and elastic in the short run. The elasticity coefficient for the variables in the short run explained that one present decrease in real interest rate by Banks brought 41885.94 decreases in the amount of non-performing loan whereas this elasticity coefficient decreased to 62,247.28 in the long run which stated that one percent increase in real interest rate introduced 62,247.28 decrease in the amount of nonperforming loan, keeping all other factors constant. (See table 4.6 and 4.7)

The impact of real interest rate on nonperforming loan ratios was high in the short run than in the long run this is due to the fact that in short run affect the project performance than in the long run because in the long run projects establish their own economies of scale and can afford the increased real interest rate and more productive. Therefore, non-performing loan were more responsive to interest rate in the short run as compared to long run.

The average exchange rate was significant in the long run and in the short run since the t-critical value (2.064) were less than t-statics value for the long run 3.68 and short run 3.14 respectively. The direction of these variables in the long run and in the short run was consistent as it showed positive sign with the non-performing loans, but its effects to the nonperforming loan ratios was elastic in the long run and as well as in the short run. The elasticity coefficient for this variable in the long run explained that one percent increase in the average exchange rate leads to 1,144, 331 increases in the amount of Nonperforming loan in Development Bank of Ethiopia. Whereas this elasticity coefficient slightly decreased to 660,117.5 in the short run which indicated that one percent increase in the average real exchange rate leads to 660,117.5 increases in amount of nonperforming loan keeping all other factors constant. (See table 4.6 and 4.7)

In the case of annual growth rate of gross domestic product, it has positive impact on the amount of nonperforming loan both in the short run and log run case. However, it is significant in the long run only since the t-critical value (2.064) was less than t -statistics values for the long run 2.08 and less than critical value for the short run -1.68 respectively. From this result we can understand that even though growth of gross domestic product is not significant in the short run it has the power to reduce the amount non-performing loan by insignificant amount. This shows that the elasticity coefficient for this variable in the long run explained that one percent increase in the annual growth rate of GDP leads to 50,842.36 increase in the amount of non-performing loan in Development Bank of Ethiopia keeping all other factors constant in the model. This result shows that against the available it is expected that the increase in the GDP impact the decrease in NPL amount. On the study conducted the determinants of non-performing loan in Nigeria proved that that, in the long run, economic growth is negatively related to non-performing loan (Olayinka and Emmanuel, 2014). Moreover, it is revealed that the research conducted on 25 Commercial Banks in Uganda by using panel data and multiple regression of macro-economic variables inflation rate, interest rate GDP growth rate found that have a negative effect on nonperforming loans but statistically insignificant effect on NPLs (Haniifah, 2015). Similar to this study The study on Islamic Banks in Malaysia on the determinants of non-performing loans using an ARDL approach based on the three explanatory variables such as interest rate, industrial production index and producer price index found that two long run relationship among the variables and note that interest rate has significant positive long run impact on NPLs. Industrial production index turns out with a positive but insignificant sign. This reflects the popular believe that Islamic banking system in Malaysia is not fully motivated by profit and loss mechanism, as the impact of interest rate is stronger relative to productivity. Producer price index appears to have negative and significant impact on NPLs. There is positive relationship between the GDP growth and the NPLs ratio that is in reverse to international evidence. In fact it is expected that a GDP growth will lead to a reduction of the NPLs ratio because all subjects in one economy when getting higher incomes will be more capable to repay their debts and this will be translated into lower NPLs ratios. According to international evidence the inflation rate is negatively related with NPLs ratio even in the Albanian banking system (Adebolaa and etal, 2011**).**

The other variable unemployment rate was significant in short run since the t-critical value (2.064) were less than t -statistics values for the short run is -4.86 and insignificant in the long run since the t-critical value (2.064) were greater than t-statistics values of -0.93. Moreover, the direction of this

variable in the long run as well as in the short run was consistent with the hypothesis of the study as it shows negative impact of unemployment rate on the nonperforming loan ratios DBE. As depicted in below table 1% decrease in unemployment rate will impact 60,262.44 decreases in the amount of non-performing in the long run and a 1% decrease in unemployment rate will impact 271,693 decreases in the amount of non-performing loan in the short run in Development Bank of Ethiopia. A study undertaken on macro-economic and bank specific determinants of NPLs in Greece by using dynamic panel data methods to examine the determinants of nonperforming loan ratios (NPLs) in the Greek financial sector found that macroeconomic variables, specifically the unemployment rate and the lending rates have a strong effect on the level of NPLs. Furthermore, Bank specific variables such as performance and efficiency indicators were found to possess additional explanatory power on NPLs (Dimitrios & et.al, 2010). His findings have several implications in terms of regulation and policy. Specifically, there is evidence that performance and inefficiency measures may serve as leading indicators of future problem loans. This suggests that the regulatory authorities could use these measures to detect Banks with potential NPLs increases. Moreover, regulators should place greater emphasis on risk management systems and procedures followed by banks in order to avert future financial instability (Dimitrios & et.al, 2010)

Similarly, to other variables average exchange rate was significant in short run since the t-critical value (2.064) were less than t -statistics values for the short run is -11.2 and insignificant in the long run since the t-critical value (2.064) were greater than t -statistics values of -0.93. Moreover, the direction of this variable in the long run as well as in the short run was consistent with the hypothesis of the study as it shows positive impact of average inflation rate on the nonperforming loan of DBE. As depicted in below table 1% decrease in average inflation rate will impact 60,262.44 decreases in the amount of non-performing in the long run and a 1% decrease in unemployment rate will impact 271,693 decreases in the amount of non-performing loan in the short run in Development Bank of Ethiopia.

The variable average inflation rate was significant in the long run and in the short run since the t-critical value (2.064) were less than t-statistics value for the long run 3.68 and short run 3.14 respectively. The direction of these variables in the long run and in the short run was consistent as it showed direct relationship with the non-performing loans, but its effects to the nonperforming loan ratios was elastic in the long run and as well as in the short run. The elasticity coefficient for this variable in the long run explained that one percent increase in the average exchange rate leads to 1,144,

331 increases in the amount of Nonperforming loan in Development Bank of Ethiopia. Whereas this elasticity coefficient slightly decreased to 660,117.5 in the short run which indicated that one percent increase in the average real exchange rate leads to 660,117.5 increases in amount of nonperforming loan keeping all other factors constant (See table 4.6 and 4.7). contrary to this study finding the paper attempts to examine the potential effect of macroeconomic variables on the downfall of loans by using the data range from 2005 to 2014 and cover 22 commercial banks operating in Bangladesh found that four macroeconomic variables named GDP growth rate, inflation rate, interest rate spread of banking sector and rate of unemployment are tested with NPL ratio in order to ascertain significant relationship for commercial banks of Bangladesh. The result of econometric analysis revealed that NPL is negatively sensitive to inflation rate and interest rate spread and positively sensitive to GDP and unemployment rate (Tandra Mondal, 2016).

Table 4.6 Estimation of Long-run Elasticity

Variables	Coef.	t	P>t
LOGRIR	-41885.9	-2.22	0.035
LOGGDPGR	50842.36	2.08	0.047
LOGINFR	-7430.75	-0.39	0.7
LOGDBECG	-2789422	-2.96	0.006
DLOGFDI	287133.3	2.44	0.022
DLOGAVER	1144331	3.68	0.001
DLOGUR	-60262.4	-0.93	0.36
DLOGEXPORT	-82.8406	-2.29	0.03
_cons	554038.2	2.06	0.05

Source: Author's Own Estimation, 2017
Significant level @ 5% critical value

Table 4:7 Estimation of Error Correction Model

Source: Author's Own Estimation, 2017
Significant level @ 5%

4.1.7. Granger Causality Test

Causality means the direction of cause from one variable to other variable which is regressed individually on each other. In this regard three cases can be identified. The first type of causality is

unidirectional causality from the first variable to second variable. The second type is bilateral causality and last one is the independence of variables from each other (Gujarati, 1995). Regression was run separately for each of the explanatory variable which is I (1) with the dependent variable of nonperforming loan ratio (NPLs) and checks the Granger-Causality. And fount that Log of DBE credit growth and Log of Annual Export Amount Granger cause Log of Non-performing Loan. Similarly, Log of Real Interest Rate, DBE credit growth and Average Exchange Rate can Granger cause Log of Average Inflation Rate. Log GDP growth rate Granger Cause and the direction was unidirectional.. The other macro-economic variables does not Granger cause each other. The result of the Granger Causality test here stated here under annex-2.

4.2. Cross Sectional Data Analysis

The second part of the data analysis is concerned to the specific factors causing nonperforming loan. Here the dependent variables the ratio non-performing loan of a specific project and explanatory variables such as borrower related factors, Bank specific factors and external factors that cause non-performing loan. The dependent variables have continuous values. Therefore, the best model complying with this type of variable is Ordinary Lease Square Model.

NPL ratio=the amount Loan Outstanding/Loan Amount Utilized

Loan Outstanding= Principal Loan + Interest Calculated on the Loan

NPL ratio= $f(\beta_0+ \beta_1x_1+ \beta_2x_2+\ldots+\beta_nx_{n)+e}$

Where

NPL Ratio= Non-performing Loan Ratio of individual project

β_0= Constant Term

$\beta_{1,}\ \beta_{1=}$ Coefficient of Variables

X1, x2= the variables causing non-performing loans

Therefore before going to regression first we need to check the data normality to avoid biasness in the data analysis.

4.2.1. Test for Linear Regression Model (LRM) Assumptions

In the descriptive statistics part, the study shows the mean, standard deviation, minimum and maximum values of the dependent and explanatory variables including the number of observation for each variable. However, this section provide test for the linear regression model (LRM) assumptions such as normality, Heteroscedasticity and multicolinearity tests. The linearity of the parameter is assumed since the model applies linear ordinary least square (OLS). The objective of the model is to

predict the strength and direction of association among the dependent and independent variables. Thus, in order to maintain the validity and robustness of the regression result of the research in Linear Regression Model, it is better to satisfy basic assumption Linear Regression Model.

As noted by Brooks (2008), when these assumptions are satisfied, it is considered as all available information is used in the model. However, if these assumptions are violated, there will be data that left out of the model. Accordingly, before applying the model for testing the significance of the slopes and analyzing the regressed result, normality, multicolinearity, and heterosckedasticity tests are made for identifying misspecification of data if any so as to fulfill research quality.

4.2.2. Normality Test

One assumption of classical linear regression model (CLRM) is the normal distribution of the residual part of the model. As noted by Gujarati (2004), OLS estimators are BLUE regardless of whether the ui are normally distributed or not. If the disturbances (ui) are independently and identically distributed with zero mean and constant variance and if the explanatory variables are constant in repeated samples, the OLS coefficient estimators are asymptotically normally distributed with means equal to the corresponding β's. However, as per the central limit theorem, if the disturbances are not normally distributed, the OLS estimators are still normally distributed approximately if there are large-sample data. Thus, since the sample size for this study is large enough, it is approximately considered as normally distributed. This implies that residuals are asymptotically normal in this study.

4.2.3. Heteroscedasticity Test

In the classical linear regression model, one of the basic assumptions is Homoskedasticity assumption that states as the probability distribution of the disturbance term remains same for all observations. That is the variance of each *ui* is the same for all values of the explanatory variable. However, if the disturbance terms do not have the same variance, this condition of non-constant variance or non-homogeneity of variance is known as heteroscedasticity (Bedru and Seid, 2005). Accordingly, in order to detect the heteroscedasticity problems, Breusch-Pagan or Cook- Weisberg test was utilized in this study. This test states that if the p-value is significant at 95% confidence interval, the data has heteroscedasticity problem, whereas if the value is insignificant (greater than 0.05), the data has no heteroscedasticity problem. Thus, as shown in annex 3, there is no heteroscedasticity problem for this study hence the p value is 32.23% showing insignificant value.

4.2.4. Multicolinearity Test

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

To overcome this problem, VIF test was conducted. That means, the larger the value of VIF indicates the more collinearity of the variables with each other. According to the rule of thumb, if VIF of a variable exceeds 10, the variable is said to be highly collinear (Bedru and Seid, 2005). Accordingly, the variance inflation factor tested. Based on the result there is no multicolinearity problem in this study. This is due to the fact that the mean of VIF of variable is 4.42 which is much lower than the threshold of 10.The VIF for each variable also very low. This indicates that the explanatory variables included in the model were not correlated with each other.

4.2.5. Result of Regression Analysis

This section presents the regression result of Ordinary Least Squares Model that made to examine the determinant of NPLs project of Development Bank of Ethiopia. Accordingly, the regression result was made and coefficients of the variables were estimated via STATA version 12 software. As stated earlier in model selection part, Ordinary Least Square Model is an appropriate model used in this study since the data's are cross sectional data of explanatory or independent variables and continuous data for the dependent variable. Thus, the model used to examine the determinants of NPLs projects of in Development Bank of Ethiopia as presented earlier. This study used Ordinary Least Square models to examine the relationship between NPLs and explanatory variables.

Thus, the regression result in the following table 4.8 demonstrates both coefficients of explanatory variables and corresponding p-values as follows with 5% percent Critical value.

Hypothesis

HO: p-vale > 5% Critical Value

H1: p-value<5% critical Value

If p-value is greater than 5 percent critical value we fail to reject the null hypothesis rather accept the null hypothesis or reject alternative hypothesis and if p-value less than 5 percent critical value we reject the null hypothesis and accept the alternative hypothesis meaning the variable is significant at 5 percent critical value.

Table 4:8 Results of the OLS (Ordinary Least Square) Regression Model

Variables	*Coef.*	*Std. Err.*	*t*	*P>t*
Poor Credit Risk Management	*-0.02982*	*0.2323*	*-0.13*	*0.898*
Elongated Loan processing Time	*-0.75237*	*0.38121*	*-1.97*	*0.053*
Poor Due Diligence Assesement	*1.473351*	*0.64117*	*2.3*	*0.025*
Insufficient Grace Period	*0.828413*	*0.31882*	*2.6*	*0.012*
Overestimation of Cash Flow	*-0.41241*	*0.38506*	*-1.07*	*0.289*
Poor Follow-up	*0.228433*	*0.22979*	*0.99*	*0.325*
Unable to provide Timely Decision	*0.125517*	*0.29945*	*0.42*	*0.677*
Rigid Credit Policy	*-0.52091*	*0.37047*	*-1.41*	*0.165*
Non-credit worthy Financing	*1.259008*	*0.42964*	*2.93*	*0.005*
Finacing with Relocated Machine	*-0.41725*	*0.4211*	*-0.99*	*0.326*
Financing second hand Machine	*1.758137*	*0.76044*	*2.31*	*0.025*
Lack of proactive Sign of default	*1.053844*	*0.47742*	*2.21*	*0.031*
Low Capacity of Credit Performers	*0.003214*	*0.2384*	*0.01*	*0.989*
Lack of Commitment by Borrowers	*-0.30864*	*0.34248*	*-0.9*	*0.371*
Loan Diversion	*-1.52419*	*0.84666*	*-1.8*	*0.077*
Poor management system of Borrower	*1.181455*	*0.79545*	*1.49*	*0.143*
Poor Repaymet Character of Borrower	*-0.61849*	*0.47423*	*-1.3*	*0.198*
Wilfull default	*1.059385*	*0.50066*	*2.12*	*0.039*
Rent Seeking Charatctre	*3.967451*	*1.54089*	*2.57*	*0.013*
Poor finacial record	*1.944305*	*0.82428*	*2.36*	*0.022*
Misfortune of Borrower	*1.455994*	*0.48438*	*3.01*	*0.004*
Change of Policy in the economic system	*1.742455*	*0.60366*	*2.89*	*0.006*
Unavailabilty Labor force silled and unskilled	*0.905113*	*0.37241*	*2.43*	*0.018*
Riots	*0.807586*	*0.41687*	*1.94*	*0.058*
Natural Disastor	*-1.02374*	*0.5882*	*-1.74*	*0.087*
Lack of co-ordination of stakeholders	*0.988741*	*0.79536*	*1.24*	*0.219*
Economic cris	*1.773121*	*0.81714*	*2.17*	*0.034*
Electric power interruption	*-0.06715*	*0.24963*	*-0.27*	*0.789*
Demand fllactuation	*1.230227*	*0.50838*	*2.42*	*0.019*
Competion from imported goods	*0.553066*	*0.34813*	*1.59*	*0.118*
Competion from local Supliers	*1.641168*	*1.06805*	*1.54*	*0.13*
Deterioration of Demand	*0.240523*	*0.47548*	*0.51*	*0.615*
Saturation of Demand	*1.775403*	*0.69111*	*2.57*	*0.013*
Remoteness from market	*2.513981*	*0.95997*	*-2.62*	*0.011*
Unsuitable agro-ecological condtion	*3.051786*	*1.19292*	*2.56*	*0.013*
_cons	*14.57891*	*5.24596*	*2.78*	*0.007*

Source: Regression result of Stata software version 12, 2017

In the above table, test of significance of the variables such as Poor Credit risk Management, elongated loan processing time, poor due diligence assessment, insufficient grace period, overestimation of cash flow, poor

follow-up, unable to provide timely decision, rigid credit policy, Non-credit worthy financing, financing with relocated machine, financing second hand machine, lack of proactive sign of default, low capacity of credit performers, lack of Commitment by borrowers, loan diversion, poor management system of borrower, poor repayment character of borrower, willful default, rent seeking character, poor financial record, misfortune of borrower, change of policy in the economic system, unavailability labor force skilled and unskilled, riots, natural disaster, lack of co-ordination of stakeholders, economic crisis, electric power interruption, demand fluctuation, competition from imported goods, completion from local Supplier's, deterioration of demand, saturation of demand, remoteness from market, and unsuitable agro-ecological condition are tested on OLS regression model

Based on the result of OLS regression model depicted in above table, the variables poor due diligence assessment, insufficient grace period given by the Bank for the repayment, non-credit worthy project financing, financing second hand machines, lack of proactive measurement for the sign of default, willful default, rent seeking character of borrowers, poor financial record system of borrowers, misfortune of borrower, change of policy in the economic system, unavailability labor force in the project area, saturation of demand for the product of the project, remoteness from market, and unsuitable agro-ecological condition are explanatory variables that increase or significantly impact the occurrence of NPLs projects in Development Bank of Ethiopia. The p-value of other variables is greater than 5 percent critical value so that we fail to reject null hypothesis since the probability of doing error is greater than 5 percent critical while accepting the alternative hypothesis. Among the significant variables such as variables poor due diligence assessment, insufficient grace period given by the Bank for the repayment, non-credit worthy project financing, financing second hand machines, and lack of proactive measurement for the sign of default are Bank related factors significantly causing non-performing loans. Willful default, rent seeking character of borrowers, poor financial record system of borrowers and misfortune of borrowers are borrower related factors significantly causing no-performing loans. Change of policy in the economic system, unavailability labor force in the project area, saturation of demand for the product of the project, remoteness from market, and unsuitable agro-ecological condition are variables significant variables subject external factors causing non-performing loan projects in the Development Bank of Ethiopia.

On the other hand, on the above table, test of significance of the variables such as Poor Credit risk Management, overestimation of cash flow, poor follow-up, unable to provide timely decision, rigid credit policy, financing with relocated machine, low capacity of credit performers, lack of

Commitment by borrowers, loan diversion, poor management system of borrower, poor repayment character of borrower, riots, natural disaster, lack of co-ordination of stakeholders, economic crisis, electric power interruption, competition from imported goods, completion from local Supplier's, deterioration of demand, and saturation of demand are insignificant factors for increment of non-performing loan projects in Development Bank of Ethiopia.

According to Seyoum etal (2016) study results on the specific internal and external factors for non-performing loans found that Poor credit assessment and credit monitoring are the major causes for the occurrence of NPL in DBE but in this study found is poor credit assessment is insignificant factor for NPLs. Actually, their conclusion on the descriptive but this study is based inferential statistics so that this study fill the gap on this case. On the other they found elongated process of loan approval were Bank specific causes for the occurrence of nonperforming loans and the same this study found that the elongated loan processing has significant positive impact on NPLs. They found that willful default, and project management problems were identified as the major customer specific causes of NPLs loan and the same this study also found these variables are significant on the non-performing loans. In contrary they found that loan diversion is significant variable that impact on NPLs but this study found that loan diversion has insignificant impact on NPLs. This study filled the gap because it used inferential statistics but they used descriptive statistics since it is very difficult to make conclusion on descriptive statistics. The determinants of successful loan repayment performance of borrowers by applying probit model found that grace period for the repayment of loan and type of labor determine successful loan repayment performance of the borrowers positively and significantly (Tadesse, 2010) and the same this study proved that grace period for repayment and labor unavailability can significantly impact NPLs positively.

CHAPTER FIVE

5. FINDINGS, CONCLUSION AND RECOMMENDATION

5.1. Findings

The main aim of the current study is to investigate the determinants of Nonperforming loan (NPLs) by using time sires data from 1980 to 2016 (37 years) of macro variables and specific internal and external variables can determine the occurrence of no-performing loan. In this study multivariate time serious models of vector error correction (VECM) vector autoregressive (VAR) model was used for time series data and Ordinary Least Square Model to cross sectional data analysis. In addition Johansson approach is applied by using eight macro-economic variables: Prior to the estimation of the specified model, test of stationary were carried out using the Augmented Dickey-Fuller tests. The results from the unit root testing revealed that the entire variables used in the estimation are integrated of order one. The order of vector Autoregressive was identified using Schwarz information criterion (SBIC). Hannan-Quinn information criterion (HQIC), Akaike information criterion (AIC), and final prediction error (FPE) criteria and the result reveled to use one lag. Johansen's procedure is used to test the presence and the number of co-integrating vectors among the series in the model, and results of maximal Eigen values and trace value suggested there is co-integration or long run relationship among the variables, the existence of this co-integration leads to the estimation of the model using an error correction model. The results proved that seven macroeconomic variables (i.e. foreign direct investment (FDI), GDP growth rate, Real interest rate, and average exchange rate, Development Bank of Ethiopia credit / loan growth, and total annual exports) are significantly associated with NPLs in the long run. Whereas, the variable unemployment rate and average inflation rate are insignificantly associated with NPLs in the long run. This suggests that seven macroeconomic variables have significant influence in affecting the level of NPLs in the long run whereas unemployment rate and average exchange rate have no impact on NPLs in the long run. On the other hand, the study proved that GDP growth rate and annual export amount has insignificant impact on the amount of non-performing loan in the short run. Whereas, foreign direct investment (FDI), Real interest rate, average exchange rate, Development Bank of Ethiopia credit / loan growth, unemployment rate and average inflation rate have significant impact on the non-perming loan in the short run. This implies that foreign direct investment, real interest rate, average exchange rate, and DBE credit growth are significant variables both in the short run and log run.

The study proved significant negative association of real interest rate, DBE credit growth, and export with amount of non-performing loan in Development Bank of Ethiopia in the long run. Whereas, the variables GDP growth, foreign direct investment, and average exchange rate has a significant positive association with the amount of non-performing loan. In the opposite the available literature, this study proved that there is negative relationship between the real interest rate. Similarly, it was expected that when credit amount increased the probability of non-performing loan can be increased. This study found that there is negative relationship between the DBE credit growths. The significant negative relationship between growth rate in export amount and NPLs suggest that growth in exports results in the improvement of NPLs in the long run.

Based on the result of OLS regression model depicted in above discussion, the variables poor due diligence assessment, insufficient grace period given by the Bank for the repayment, non-credit worthy project financing, financing second hand machines, lack of proactive measurement for the sign of default, willful default, rent seeking character of borrowers, poor financial record system of borrowers, misfortune of borrower, change of policy in the economic system, unavailability labor force in the project area, saturation of demand for the product of the project, remoteness from market, and unsuitable agro-ecological condition are explanatory variables that increase or significantly impact the occurrence of NPLs projects in Development Bank of Ethiopia.

5.2. Conclusion

The positive association between the foreign Direct Investment and NPL proved that the positive association is that with the increase in FDI, economic activities and credit in the country increases, with the passage of time when foreign investors' confidence in the economy declines or they anticipate depreciation of currency, lowering of interest rate after large inflow of money or expect financial crisis in repay the loan increases consequently NPLs declines. The country, they suddenly withdraw their investments leaving Banks illiquid. This also results in the slowing down the pace of economic activities in the country, which results in the inability of the borrowers to repay that with the increase in interest rate the difference loans. Due to the increase in FDI, domestic lending increases more than the income of the households and firms results in growth of NPLs on the withdrawal funds of foreign investments. And it will expect that to have a positive impact of FDI on $NPL_{S.}$ This study proved there is positive significant association between the NPL and GDP growth against to available literature, it is assumed if annual growth rate of GDP increased, the amount of nonperforming loan in the Banks will reduced. Different literatures suggested there is a significant negative association between growth in

GDP and NPLs. The explanation for negative relation is that increase in growth of GDP leads to the ability to repay the loans increases, as a result NPLs decreases. Conversely, with the decrease in GDP, to repay loan decreases resulting in the growth of NPLs. On the other hand this study found out that there is significant positive association of NPL and average exchange rate growth. The gradual devaluation of the value of Birr has made domestic product more and cheaper for importers from aboard and enhances export and increased the demand for domestically produced exportable goods. And conversely real appreciation would make export less competitive in the world market and hence decreased total export. The positive association of real effective exchange rate with NPLs and concluded that the inflationary pressure and increase in real average Exchange rate contributes to the growth in NPLs.

Regarding to elasticity of variables foreign direct investment, real interest rate, unemployment rate, DBE credit growth, and average inflation rate, are more elastic in the short run than long run while average exchange rate, GDP growth rate and export amount are more elastic in the long run that short run.

Among the significant variables such as variables poor due diligence assessment, insufficient grace period given by the Bank for the repayment, non-credit worthy project financing, financing second hand machines, and lack of proactive measurement for the sign of default are Bank related factors significantly causing non-performing loans. Willful default, rent seeking character of borrowers, poor financial record system of borrowers and misfortune of borrowers are borrower related factors significantly causing no-performing loans. Change of policy in the economic system, unavailability labor force in the project area saturation of demand for the product of the project, remoteness from market, and unsuitable agro-ecological condition are variables significant variables subject external factors causing non-performing loan projects in the Development Bank of Ethiopia.

5.3. Recommendation

The findings of the macroeconomic variables have policy related implications for the Development Bank of Ethiopia (DBE). DBE can use the findings to predict changes in the NPLs to take precautionary measures to prevent any financial crisis.

The government can also play important role in improving the level of NPLs in the economy by influencing the macroeconomic variables. For instance, government should create conducive policy for thus projects that create forward and back ward linkage (producing input to other factors and receiving other factories output), low level of unemployment, economic activities in the economy and high

exports. In order to increase the exports of tile country government can provide incentives to the manufacturer by developing basic infrastructure, reducing taxes, providing low cost loans and can help exporters in strengthen the existing relations and exploring new international markets(those markets which are not addressed by the country before). The government can increase the economic activities, employment rate, production level and exports by doing special agreements with the neighboring countries (countries around and near to Ethiopian territories) for free trade.

Currently this study has used eight macroeconomic variables to investigate their impact/relationship with on NPLs. whereas future studies can use other macroeconomic variables (like, total import, investment, consumption, national income etc.) and other borrower and bank specific determinants of nonperforming loan ratios to investigate NPLs behavior. The results of such studies will be beneficial for the policy makers, because it can help to anticipate any adverse effect of each variable on the level of NPLs.

The finding of current study and future studies by using above mentioned variables can be helpful in predicting and controlling Banking crisis in the Development Bank of Ethiopia in particular and Ethiopian Banks in general.

From the result of internal and external factors regression the researcher recommended the Development Bank of Ethiopia should develop effective and efficient due diligence assessment procedure complying complexity and dynamic characteristics of project and/or the borrowers. Sufficient grace period should be given for borrowers considering the implementation and turnover of the business. The other significant variables that cause NPLs is financing with second hand machineries so that the Bank policy makers should either avoid or minimize scrutinize second hand machinery financing. The Bank should develop the system that helps to detect the proactively the sign of default. The Bank should change the policy in financing second hand machineries, proactively understand sign of default, the Ban should develop controlling mechanism for borrowers factors, and external factors in project financing so as to minimize the amount of non-performing loans in the Bank.

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Annex-1

Table 9 Result of Granger Causality Test

Granger causality Wald tests

Equation	Excluded	F	df	df_r	Prob > F
lognpls	logrir	3.0305	1	25	0.0940
lognpls	loggdpgr	3.8604	1	25	0.0606
lognpls	logaiflr	.48949	1	25	0.4906
lognpls	logdbecg	5.259	1	25	0.0305
lognpls	dlogfdi	.38624	1	25	0.5399
lognpls	dlogaexr	.70928	1	25	0.4077
lognpls	dlogur	.57162	1	25	0.4567
lognpls	dlogexportmilli~r	6.5318	1	25	0.0171
lognpls	ALL	4.2533	8	25	0.0025
logrir	lognpls	.60183	1	25	0.4452
logrir	loggdpgr	1.6451	1	25	0.2114
logrir	logaiflr	.02141	1	25	0.8848
logrir	logdbecg	.1629	1	25	0.6899
logrir	dlogfdi	1.3035	1	25	0.2644
logrir	dlogaexr	.95497	1	25	0.3378
logrir	dlogur	1.261	1	25	0.2721
logrir	dlogexportmilli~r	.66035	1	25	0.4241
logrir	ALL	1.0574	8	25	0.4225
loggdpgr	lognpls	.5522	1	25	0.4643
loggdpgr	logrir	.01738	1	25	0.8962
loggdpgr	logaiflr	2.6875	1	25	0.1137
loggdpgr	logdbecg	.02061	1	25	0.8870
loggdpgr	dlogfdi	.29348	1	25	0.5928
loggdpgr	dlogaexr	.80487	1	25	0.3782
loggdpgr	dlogur	1.9261	1	25	0.1774
loggdpgr	dlogexportmilli~r	2.2192	1	25	0.1488
loggdpgr	ALL	2.097	8	25	0.0751
logaiflr	lognpls	.97049	1	25	0.3340
logaiflr	logrir	17.161	1	25	0.0003
logaiflr	loggdpgr	1.2819	1	25	0.2683
logaiflr	logdbecg	7.9807	1	25	0.0092
logaiflr	dlogfdi	.19097	1	25	0.6659
logaiflr	dlogaexr	5.641	1	25	0.0255
logaiflr	dlogur	.5522	1	25	0.4643
logaiflr	dlogexportmilli~r	1.5564	1	25	0.2237
logaiflr	ALL	3.5329	8	25	0.0072
logdbecg	lognpls	.00913	1	25	0.9247
logdbecg	logrir	.32384	1	25	0.5744
logdbecg	loggdpgr	3.5384	1	25	0.0717
logdbecg	logaiflr	1.0932	1	25	0.3058
logdbecg	dlogfdi	.968	1	25	0.3346
logdbecg	dlogaexr	.08287	1	25	0.7758
logdbecg	dlogur	.08596	1	25	0.7718
logdbecg	dlogexportmilli~r	.74722	1	25	0.3956
logdbecg	ALL	1.0061	8	25	0.4562
dlogfdi	lognpls	4.1788	1	25	0.0516
dlogfdi	logrir	.41748	1	25	0.5241
dlogfdi	loggdpgr	1.1206	1	25	0.2999
dlogfdi	logaiflr	.77219	1	25	0.3879
dlogfdi	logdbecg	3.2356	1	25	0.0841
dlogfdi	dlogaexr	1.289	1	25	0.2670
dlogfdi	dlogur	.0029	1	25	0.9575
dlogfdi	dlogexportmilli~r	1.495	1	25	0.2328
dlogfdi	ALL	.85982	8	25	0.5617
dlogaexr	lognpls	1.4101	1	25	0.2462
dlogaexr	logrir	.00521	1	25	0.9430
dlogaexr	loggdpgr	.57276	1	25	0.4562
dlogaexr	logaiflr	3.5441	1	25	0.0714
dlogaexr	logdbecg	2.5781	1	25	0.1209
dlogaexr	dlogfdi	.09182	1	25	0.7644
dlogaexr	dlogur	.12006	1	25	0.7319
dlogaexr	dlogexportmilli~r	.0182	1	25	0.8938
dlogaexr	ALL	1.9415	8	25	0.0979
dlogur	lognpls	.45854	1	25	0.5045
dlogur	logrir	.02418	1	25	0.8777
dlogur	loggdpgr	1.9257	1	25	0.1775
dlogur	logaiflr	.01717	1	25	0.8968
dlogur	logdbecg	.10249	1	25	0.7515
dlogur	dlogfdi	.05911	1	25	0.8099
dlogur	dlogaexr	.22276	1	25	0.6410
dlogur	dlogexportmilli~r	.00115	1	25	0.9732
dlogur	ALL	.49476	8	25	0.8483
dlogexportmilli~r	lognpls	.86171	1	25	0.3621
dlogexportmilli~r	logrir	.29027	1	25	0.5948
dlogexportmilli~r	loggdpgr	.43371	1	25	0.5162
dlogexportmilli~r	logaiflr	4.5293	1	25	0.0434
dlogexportmilli~r	logdbecg	2.4926	1	25	0.1270
dlogexportmilli~r	dlogfdi	.02329	1	25	0.8799
dlogexportmilli~r	dlogaexr	4.668	1	25	0.0405
dlogexportmilli~r	dlogur	.23231	1	25	0.6340
dlogexportmilli~r	ALL	2.1297	8	25	0.0711

Annex 2

Table 10 Descriptive Statistics Summary of Cross Sectional Data

Variable	Obs	Mean	Std. Dev.	Min	Max
ratioofnpl	91	1.000315	.5083109	.154974	2.970552
x1	91	3.901099	1.011654	2	5
x2	91	3.868132	.8845437	1	5
x4	91	3.252747	1.234625	1	5
x4	91	3.252747	1.234625	1	5
x5	91	3.703297	1.178459	1	5
x8	91	3.461538	1.1383	1	5
x10	91	3.824176	.8893619	1	5
x12	91	3.945055	.9928929	2	5
x14	91	3.67033	1.155229	1	5
x15	91	3.010989	1.269247	1	5
x16	91	3.098901	1.229769	1	5
x17	91	3.67033	.9781496	1	5
x18	91	3.340659	1.156813	1	5
x19	91	3.879121	.8410993	1	5
x20	91	3.835165	1.035629	1	5
x21	91	3.703297	.9486189	1	5
x23	91	4.065934	.8138004	2	5
x24	91	3.659341	.8329303	2	5
x26	91	2.582418	1.075649	1	5
x27	91	2.802198	1.30145	1	5
x29	91	3.230769	.8573463	1	5
x31	91	2.736264	.9641941	1	5
x32	91	3.340659	1.194616	1	5
x33	91	2.879121	1.227782	1	5
x34	91	2.835165	1.176282	1	5
x35	91	2.758242	1.098895	1	5
x36	91	2.615385	1.190418	1	5
x37	91	2.824176	1.362949	1	5
x38	91	2.648352	1.344732	1	5
x39	91	2.604396	1.22818	1	5
x40	91	2.197802	1.107748	1	5
x42	91	2.494505	1.294206	1	5
x43	91	2.406593	1.357923	1	5
x44	91	2.505495	1.530241	1	5
x45	91	2.32967	1.317025	1	5

Annex 3

Table 11 Hetroscedexity Test

```
. estat hettest

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

         chi2(1)      =     0.98
         Prob > chi2  =   0.3223

.
. sum ehat, detail

                        Residuals
-------------------------------------------------------------
      Percentiles      Smallest
 1%    -.7391039      -.7391039
 5%    -.5973968      -.7175341
10%    -.4851742      -.6780141       Obs                  86
25%    -.2940224      -.6402749       Sum of Wgt.          86

50%     -.034539                      Mean           1.52e-10
                       Largest       Std. Dev.       .419608
75%     .1722116       .7102063
90%     .4880577       1.075615       Variance       .1760709
95%     .7097935       1.124825       Skewness       1.108796
99%       1.7502         1.7502       Kurtosis       5.783856
```

Annex 4

Table 12 Multi-Collinearity Test

```
. vif
```

Variable	VIF	1/VIF
x15	10.62	0.094150
x16	7.98	0.125313
x3	6.07	0.164684
x5	5.75	0.173856
x13	5.23	0.191265
x4	4.63	0.216150
x1	4.53	0.220659
x6	4.31	0.232014
x2	4.01	0.249111
x8	3.96	0.252619
x7	3.46	0.288974
x11	3.26	0.306526
x14	3.02	0.331028
x10	2.56	0.390924
x9	2.02	0.493962
x17	1.94	0.515517
x12	1.81	0.553229
Mean VIF	4.42	

Appendix 1 Questionnaire

Saint Mary University

School of Business

Project Management Department

Questionnaire to be filled by the respondents

Dear Respondents,

My name is Dagne Mulatu and Sr. Loan Officer in Development Bank of Ethiopia. I am studying MA in project management in Saint Mary University and now I am going to conduct study on Macro Economic and specific Determinant of Non-Performing Loan in Development Bank of Ethiopia financed projects. Dear Respondent I would like expresses my deep appreciation for your time, honest and prompt response.

Objective: -this questionnaire is designed to collect primary data on Macro Economic and specific Determinant of Non-Performing Loan in Development Bank of Ethiopia financed projects for partial fulfillment of MA in Project Management. Therefore, the research is to be evaluating in terms of its contribution to your understanding of Macro Economic and specific Determinant of Non-Performing Loan in Development Bank of Ethiopia.

General Instruction

- ✓ No need of writing your names
- ✓ In all cases where answer option are available tick (√) in the appropriate space provided

Confidentiality: I want to assure you that the data you provided is only for purpose authorized by Saint Mary University and no other can access the data you provided to me. Dear respondents please fill the questionnaire considering or taking in to account the project you are managing and running only.

If you have any queries concerning the questionnaire, please contact me

Name DagneMulatu

Mobile Phone- +251-921-37-36-21

Email: zytemulatu@hotmail.com

Addis Ababa

Thank you in advance for your cooperation

I. General Information

1. Name of the project : _____
2. Sector of project : _____

3. Amount of Loan Approved : _____
4. The amount of loan outstanding in Birr : _____
5.

II. Specific Questionnaire

Dear the respondent please respond the below factors by rating in the order importance for the determinant of Non-performing loans

5= Strongly Agree 4=Agree 3= Neutral 2= Disagree 1= Strongly Disagree

Sr. No	Bank related and Borrower as well as External Factors related Determinants of Non-performing Loans	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	**Bank Specific Factors**					
1.1.	Poor Credit risk management of the Bank					
1.2.	Elongated loan processing time in loan granting					
1.3.	Poor due diligence assessment					
1.4.	Insufficient grace period given by the Bank					
1.5.	Overestimation of the cash flow during project appraisal					
1.6.	Over financing of the project					
1.7.	Under financing of the project					
1.8.	Poor project follow-up and supervision					
1.9.	Inefficient project monitoring and controlling					
1.10.	Unable to provide timely decision to borrowers problems					
1.11.	Lenient / lax credit term cause loan default					
1.12.	Rigidity of the credit policy of the Bank to respond the dynamic characteristics of the Borrowers					
1.13.	Low capacity of credit performers to manage the borrowers efficiently					
1.14.	Financing of non-credit worthy borrowers from its stand					
1.15.	Financing of the foreign investors with condition of relocated					

	machineries					
1.16.	Financing of the foreign investors with condition of second hand machineries					
1.17.	Lack of proactive measurement for sign of default					
1.18.	Poor due diligence assessment from its stand					
2.	**Borrower Related Factors**					
2.1.	Lack of long-term commitment of borrowers to fulfill its obligation					
2.2.	Loan diversion from the planned purpose to other business					
2.3.	Willfully default					
2.4.	Poor project management system of the project					
2.5.	Poor loan repayment characteristics of the borrowers					
2.6.	Rent seeking characteristics of the borrowers					
2.7.	Inefficient financial recording keeping of the projects managers					
2.8.	Death of the major shareholders or owner of the project					
2.9.	Misfortune of the borrowers					
3.	**Economical/political/social factors**					
3.1.	Change of the policy in the economic system					
3.2.	Unavailability of labor force in required amount and quality					
3.3.	Occurrence riots in project areas					
3.4.	Natural disaster such earth quake, storm, pesticide, drought, flood plainand soon					
3.5.	Lack of co-ordination among stakeholders of the project					
3.6.	Economic crisis in the country and the globe					
3.7.	Political intervention in project financing					
3.8.	Political unrest in the country					

3.9.	Electric power interruption during production					
4.	**Market Condition**					
4.1.	Fluctuation of demand for the products					
4.2.	Competition from imported goods					
4.3.	Competition from the local suppliers					
4.4.	Availability of substituted goods for the output of the project					
4.5.	Significant deterioration of demand for the product					
4.6.	Saturation of the market for the output of the project					
4.7.	Remoteness of the project area					
5.	**Environmental factors**					
5.1.	Natural hazards in project area such as storm, over rain fall, fire, pests or flood plain and soon					
5.2.	Unsuitable agro-ecological condition for the project					

6. *If any other factors you are experiencing for non-performing loans please state here under*

_____

_____

_____

_____

_____

Thank You