**ST.MARY'S UNIVERSITY SCHOOL
OF GRADUATE STUDIES**

FACTORS AFFECTING NON-PERFORMING LOAN IN THE CASE OF ETHIOPIAN COMMERCIAL BANKS

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Table of Contents

ACKNOWLEDGEMENTS

ACRONYMS AND ABBRIVATIONS

NBE – National Bank of Ethiopia

CBE – Commercial Bank of Ethiopia

DB – Dashen Bank S.C.

AIB – Awash International Bank S.C.

BOA – Bank of Abyssiniya S.C.

UB – United Bank S.C.

NIB – Nib international Bank S.C.

BS – Bank Size

EXR – Exchange Rate

GDP – Gross Domestic Product

INFR – Inflation Rate

LG – Loan Growth

LIQ – Liquidity

LR – Lending Rate

ROA – Return on Asset

List of Tables

List of Figures

ABSTRACT

The main objectives of the study were to examine factors affecting non-performing loans in Ethiopian commercial banks in the period 2002 – 2016. The study used secondary data which is audited annual financial reports of the seven selected banks. Descriptive and inferential statistics are used to analyze the data collected. The descriptive statistic shows the trend analysis of the dependent and independent variables by using graphical methods, while panel regression analysis was used to identify the relative importance of each independent variables influence NPLs of Ethiopian banks by using E-views 9 software. The finding of the study shows that the trend analysis of dependent and independent variables are downward sloping and NPLs level indicates above the threshold of NBE rules. The regression result shows the determinant variables are a significant relationship with NPLs. Based on the findings the researcher forward subsequent recommendation: each banks improve the inspection techniques and bankers must understand how the risks of individual loans and portfolios are interrelated and the bank managers should be ensure the credit department adequately resourced to support for monitoring activities and follow up the borrowed fund are being used the intended purpose and timely monitor the loan is being disbursed.

Key words: Non-performing loan, Micro-economic and internal bank factors

CHAPTER ONE

1. Introduction

Banks are very important constituents in the financial system of countries and play a fundamental role in the global economy. Therefore, if the financial system does not work properly, its problems have a strong impact on the whole economy (Rodriguez-Moreno, Pena, 2013). For this reason, this study is to assessing factors affecting non-performing loan in commercial bank of Ethiopia through selecting some commercial banks activities. To achieve the overall objective of the study will use several techniques in the entire chapter, in this regards in chapter one the study briefly provide the introductory parts such as, background of the study, organizational background, statement of the problem, basic research questions, objective of the study, scope of the study and significance of the study.

1.1. Background of the Study

Lending is the principal business activity for commercial banks. The loan portfolio is typically the largest asset and the predominant sources of revenue. As such, it is one of the greatest sources of risk to a bank's safety and soundness (Richard, 2009). According to directives of national bank of Ethiopia "loan" or advances" means any financial asset of the bank arising from the direct or indirect advances by a bank to a person that are conditioned on the obligation of the person to repay the fund, either on a specified date or dates usually within interest (Tsinghua, 2008) .While performing one of its main functions granting loan, the bank is exposed to credit risk i.e. non-performing loan; A loan that is not earning income or full payment of principal and interest is no longer anticipated i.e. Principal or interest is 90 days or more delinquent.

The issue of non-performing loans has gained increasing attentions in because the immediate consequence of large amount of NPL in the banking system is bank failure (Holger, 2008). Literature reveals there are a lot of challenges that can tackle loan management system of banks in Ethiopia such as, due to lax credit standard, poor portfolio risk management, or weakness in the economy; loan portfolio problems have historically been the major cause of bank loss and failures (Wondimu, 2007). Effective management of loan portfolio and the credit function is fundamental to bank's safety and soundness. Loan portfolio management (LPM) is the process by which risks

that are inherent in the credit process are managed and controlled. Healthy loan portfolios are vital assets for banks in view of their positive impact on the performance of banks. Unfortunately, some of these loans usually do not perform and eventually result in nonperforming which affect banks' earnings on such loans (Fofack, 2005).

These non-performing loans become cost to banks in terms of their implications on the quality of their assets portfolio and profitability. This is because in accordance with banking regulations, banks make provisions for non-performing loans and charge for NPLs which reduce their loan portfolio and income (Bloem & Gorter, 2001).

The rise of non-performing loan portfolios in banks significantly contributed to financial distress in the banking sector. Non-performing loans are the main contributor to liquidity risk, which exposes banks to insufficient funds for operations. As loans & advances are the major portion of bank's asset, when they become non-performing, it will affect both profitability and liquidity of the bank.

The minimization of NPL is a necessary condition for improving economic growth. When NPL retained permanently, these will have an impact on the resources that are enclosed in unprofitable areas. Thus, NPL are likely to hamper economic growth and reduce the economic efficiency (Hou, 2007). The shocks to the financial system can arise from factors specific to the company (idiosyncratic shocks) or macroeconomic imbalances (systemic shocks). In general, the researches adopted in Ethiopia commercial banks affected by several types of factors whether through internal or external factors , therefore, investigating and studying factors affecting commercial banks non-performing loan is important.

1.2 Overview of banking history in Ethiopia

The agreement that was reached in 1905 between Emperor Minilik II and Mr. Ma Gillivray, representative of the British owned National Bank of Egypt marked the introduction of modern banking in Ethiopia. Following the agreement, the first bank called Bank of Abyssinia was inaugurated in Feb.16, 1906 by the Emperor. The Bank was totally managed by the Egyptian

National Bank.

Generally, in its short period of existence, Bank of Abyssinia had been carrying out limited business such as keeping government accounts, some export financing and undertaking various

2

tasks for the government. Moreover, the Bank faced enormous pressure for being inefficient and purely profit motivated and reached an agreement to abandon its operation and be liquidated in order to disengage banking from foreign control and to make the institution responsible to Ethiopia's credit needs. Thus by 1931 Bank of Abyssinia was legally replaced by Bank of

Ethiopia shortly after Emperor Haile Selassie came to power.

The new Bank, Bank of Ethiopia, was a purely Ethiopian institution and was the first indigenous bank in Africa (NBE 2009/2010) and established by an official decree on August 29, 1931 with capital of £750,000. Bank of Egypt was willing to abandon it's on cessionary rights in return for a payment of Pound Sterling 40,000 and the transfer of ownership took place very smoothly and the offices and personnel of the Bank of Abyssinia including its manager, Mr. Collier, being retained by the new Bank. Ethiopian government owned 60 percent of the total shares of the

Bank and all transactions were subject to scrutiny by its Minister of Finance.

Bank of Ethiopia took over the commercial activities of the Bank of Abyssinia and was authorized to issue notes and coins. The Bank with branches in Dire Dawa, Gore, Dessie, Debre

Tabor, Harar, agency in Gambella and a transit office in Djibouti continued successfully until the

Italian invasion in 1935. During the invasion, the Italians established branches of their main

Banks namely Banco di Italia, Banco di Roma, Banco di Napoli and Banco Nazionale del lavoro and started operation in the main towns of Ethiopia. However, they all ceased operation soon after liberation except Banco di Roma and Banco di Napoli which remained in Asmara. In 1941 another foreign bank, Barclays Bank, came to Ethiopia with the British troops and organized banking services in Addis Ababa, until its withdrawal in 1943. Then on 15th April 1943, the

State Bank of Ethiopia commenced full operation after 8 months of preparatory activities. It acted as the central Bank of Ethiopia and had a power to issue bank notes and coins as the agent of the Ministry of Finance. In 1945 and 1949 the Bank was granted the sole right of issuing currency and deal in foreign currency. The Bank also functioned as the principal commercial bank in the country and engaged in all commercial banking activities.

The State Bank of Ethiopia had established 21 branches including a branch in Khartoum, Sudan and a transit office on Djibouti until it ceased to exist by bank proclamation issued on December,

1963. Then the Ethiopian Monetary and Banking law that came into force in 1963 separated the function of commercial and central banking creating National Bank of Ethiopia (NBE) and commercial Bank of Ethiopia (CBE). Moreover it allowed foreign banks to operate in Ethiopia limiting their maximum ownership to be 49 percent while the remaining balance should be owned by Ethiopians.

There were two other banks in operation namely Banco di Roma S. C. and Bank of di Napoli S.C. that later reapplied for license according to the new proclamation each having a paid up capital of Eth. Birr 2 million. The first privately owned bank, Addis Ababa Bank S.C., was established on Ethiopians initiative and started operation in 1964 with a capital of 2 million in association with National and Grindlay Bank, London which had 40 percent of the total share. In 1968, the original capital of the Bank rose to 5.0 million and until it ceased operation, it had 300 staff at 26 branches.

There were other financial institutions operating in the country like the Imperial Savings and Home Ownership Public Association (ISHOPA) and Saving and Mortgage Corporation of Ethiopia (SMCE). But following the declaration of socialism in 1974 the government extended its control over the whole economy and nationalized all large corporations. Organizational setups were taken in order to create stronger institutions by merging those that perform similar functions. Accordingly, the three private owned banks, Addis Ababa Bank, Banco di Roma and Banco di Napoli Merged in 1976 to form the second largest Bank in Ethiopia called Addis Bank with a capital of Eth. birr 20 million and had a staff of 480 and 34 branches. Before the merger, the foreign participation of these banks was first nationalized in early 1975. Then Addis Bank S.C. and Commercial Bank of Ethiopia were merged by proclamation No.184 of August 2, 1980 to form the sole commercial bank in the country till the establishment of private commercial banks in 1994. The Commercial Bank of Ethiopia commenced its operation with a capital of Birr 65 million, 128 branches and 3,633 employees. The Savings and Mortgage Corporation S. C and Imperial Saving and Home Ownership Public Association were also merged to form the Housing and Saving Bank with working capital of Birr 6 million and all rights, privileges, assets and liabilities were transferred by proclamation No.60, 1975 to the new bank.

Following the fall of the Dergue regime in 1991 that ruled the country for 17 years under the rule of command economy, the EPRDF declared a liberal economy system. In line with this,

Monetary and Banking proclamation of 1994 established the National Bank of Ethiopia as a judicial entity, separated from the government and outlined its main function.

Monetary and Banking proclamation No.83/1994 and the Licensing and Supervision of Banking Business No.84/1994 laid down the legal basis for investment in the banking sector.

Consequently after the proclamation issued private equity holders began to join the Ethiopian banking industry and as of today seventeen commercial banks are operated and out of this sixteen are private owned.

Table 1.1 Lists of public and private Commercial Banks in Ethiopia

S.N	Name of bank	Year of esta	Ownership
1	Commercial Bank of Ethiopia (CBE)	1963	Public
2	Awash International Bank S.C (AIB)	*1994*	Private
3	Dashen Bank S.C (DB)	1995	Private
4	Bank of Abyssinia S.C (BoA)	1996	Private
5	Wegagen Bank S.C (WB)	1997	Private
6	United Bank S.C (UB)	1998	Private
7	Nib International Bank S.C (NIB)	1999	Private
8	Cooperative Bank of Oromia S.C (CBO)	2005	Private
9	Lion International Bank S.C (LIB)	2006	Private
10	Oromia International Bank S.C (OIB)	2008	Private
11	Zemen Bank S.C (ZB)	2009	Private
12	Bunna International Bank S.C (BIB)	2009	Private
13	Berhan International Bank S.C (BBI)	2010	Private

14	Abay Bank S.C. (AB)	2010	Private
15	Addis international Bank SC. (AdIB)	2011	Private
16	Debub Global Bank S.C. (DGB)	2012	Private
17	Enat Bank S.C. (EB)	2013	Private

Source NBE annual report 2015/16

1.3 Statement of the problem

According to directives of national bank of Ethiopia "loan" or advances" means any financial asset of the bank arising from the direct or indirect advances by a bank to a person that are conditioned on the obligation of the person to repay the fund, either on a specified date or dates usually within interest (Directives of National Bank of Ethiopia 2008) .While reforming one of its main functions granting loan, the bank is exposed to credit risk i.e. non-performing loan; A loan that is not earning income or full payment of principal and interest is no longer anticipated i.e. Principal or interest is 90 days or more delinquent.

The rise of non-performing loan portfolios in banks significantly contributed to financial distress in the banking sector. Non-performing loans are the main contributor to liquidity risk, which exposes banks to insufficient funds for operations. As loans & advances are the major portion of bank's asset, when they become non-performing, it will affect both profitability and liquidity of the bank (Hou, 2007)

There are two factors affecting the occurrence of non-performing loans, namely macroeconomic factors and bank specific factors. Macroeconomic factors include government policy, inflation, currency change and GDP and the bank specific factors include interest rate charged by banks, bank size, ownership (state owned and private), integrity problem, credit follow up weakness, and others related problems (Ricardas, 2014).

According to National Bank of Ethiopia's (NBE), report in 2015/16 there is NPL performance in commercial banks of Ethiopia even their threshold average is varies year to year but, the result of NBE only indicate average result of each banks based on the standard of the NBE, however, it was not indicated factors that affect each banks of non-performing loan practice. These is one of the knowledge gap that motivated the researcher to assess factor affecting nonperformance loan of commercial banks. In addition to NPL result of NBE, the study also assess several research results

to reduced similarity, accordingly there are several research results related with NPL, however, there were no exact similar research results except the study took place by, Wondimu (2012) conducted a study on determinants of nonperforming loans and found as poor credit assessment ,failed loan monitoring, underdeveloped credit culture, lenient credit terms and conditions, aggressive lending, compromised integrity, weak institutional capacity, unfair competition among banks, and fund diversion for un expected purposes and overdue financing had an effect on the occurrence of NPLs. Even though as to the knowledge of the researcher, there is only a single study made by Wondimu (2012) in Ethiopia which is related with this title and in addition there is time gap between the researches mad by Wondimu and the proposed study of this paper.

Thus, given the unique features of banking sector and environment in which they operate and also rapid expansion of banking institutions in Ethiopia, there is strong wishes to conduct a study on the identification of factors affecting NPLs of commercial banks in Ethiopia.

1.4 Research Questions

The following specific research questions were formulated to fill the above gaps

1. What are the internal factors that affect NPLs of commercial Banks of Ethiopia?
2. What are the External (Macroeconomic) factors affecting NPLs of commercial Banks of Ethiopia
3. **What seem strands of Commercial banks of Ethiopia regarding NPLs performance?**

1.5 Objectives of the study

1.5.1 General Objective of the Study

Objectives of the study is assessing factors affecting NPLs of commercial banks of Ethiopia. Non-performing loans proportion is one of the determinant factors that depict soundness of the banking sector. Thus, identifying and investigating the determinants of nonperforming loans is the central objective of this study.

1.5.2 Specific objectives of the Study

The following are the specific objective of the study:

1. To assess internal factors that affect NPLs of commercial Banks of Ethiopia

2. To assess the External (Macroeconomic) factors affecting NPLs of commercial Banks of Ethiopia

3. To examine strands of Commercial banks of Ethiopia regarding NPLs performance

1.6 Research Hypothesis

The purpose of this study is to examine the determinants of nonperforming loans (NPLs) of commercial banks in Ethiopia. The empircial studies made around the world demonstrate various outcomes on determinants of nonperforming loans of the financial sectors divided in to internal and external factors as discussed in the major research questions part of the study. Accordingly the study hypothesized the following major areas as a determinate variables (Null hypothesis).

H1.Bank size (BS) has positive relation with NPLs of commercial banks in Ethiopia.

H2.Exchange rate (EXR) has negative relation with NPLs of commercial banks in Ethiopia.

H3.Gross domestic product (GDP) has a positive/negative relation with NPLs of commercial banks in Ethiopia

H4.Inflation rate (INF) has positive/negative relation with NPLs of commercial banks in Ethiopia

H5. Loan growth (LG) has positive relation with NPLs of commercial banks in Ethiopia.

H6.Liquidity (LIQ) has positive/negative relation with NPLs of commercial banks in Ethiopia.

H7. Lending rate (LR) has positive relation with NPLs of commercial banks in Ethiopia.

H8.Return on asset (ROA) has positive relation with NPLs of commercial banks in Ethiopia

1.7 Significance of the study

The finding of this study which details with the determinants of nonperforming loan of Commercial banks in Ethiopia are beneficial for different stakeholders such as, for academicians, bank sectors, as well as for the researcher to develop technical knowhow of how academic research's developed technically. In addition, since such investigation has policy implication, the finding of this study might be used as a directive input in developing regulatory standards regarding the lending policies of commercial banks of Ethiopia. This study initiate the commercial Bank management to give due emphasis on the management of the identified variables and

provides them with understanding of activities to enhance their loan performance indicate which factors more affecting the environment.

1.8 Scope of the Study

This study delimited in scope of delimited commercial banks, issues that had been discussed as well as panel data. Accordingly, the study limit this study the commercial banks found in Ethiopia namely commercial bank of Ethiopia, Awash international bank, Dashen bank, bank of Abyssinia, United bank, and Nib International bank and Wegagen bank that, this is because the banks have similar lending experience in Ethiopia as they joined early in the market. The study also specified in the issued that had been discussed such as, internal (specific) factors, that could arise from the banks strategies, capacity, competitiveness and others related factors determined by each banks practices and the macroeconomics factors that can affect the banks activities such as, inflation and GDP. The study also assess past trend of each banks performance of NPLs (2002 – 2016 G.C) collecting from each banks Annual report as well as NBE report.

1.9 Limitation of the Study

Due to the confidential policy of banks, only access officially disclosed financial information. The study was also limited to financial constraints and shortage of time forced the researcher to minimize scope and reduce sample size which lessened richness of the outcome and in turn affects the generality of the findings into the whole banking practice.

1.10 Organization of the paper

This thesis is organized into five chapters. The first chapter starts with presenting background of the study, statement of the problem, objective of the study, significance of the study, scope and limitation of the study. The second chapter focuses on both theoretical and empirical review of related literature. The third chapter deals with the research methodology. Chapter four deals with the data analysis and presentation and the fifth chapter contain the conclusion and recommendation of the study including the direction for further study

CHAPTER TWO

Review Related Literature

2.1 Introduction

This chapter starts with presenting the overview of banking system in Ethiopia. Besides, bank loans including it determinant factors were presented. Furthermore, concepts relating to nonperforming loans are discussed. Following this, empirical studies (cross countries and single country) are reviewed by focusing on determinants of NPLs are presented.

2.2 Basic concept of loan

Lending Bank loans finance different corporate groups in the economy. Manufacturers, distributors, service firms, farmers, builders, homebuyers, commercial real estate developers, retailers, and others all depend on bank credit (Wondimu, 2012). The ways in which banks allocate their funds strongly influences the economic development of the community and nation. Every bank bears a degree of risk in its granting of credit, and, without exception, every bank experiences some loan losses when certain borrowers fail to repay their loans. Whatever the degree of risk taken loan, losses can be minimized through highly professional organization and management of the lending functions. The composition and quality of a bank's loans should be reflected in its loan policy. The policy sets out the bank's lending philosophy and specifies procedures and means of monitoring lending activity (Holger, 2008).

2.3 Non-Performing Loans

The term ''bad loans'' as described by Basu (1998), is used interchangeably with nonperforming and impaired loans as identified in Fofack (2005). (Berger and De Young, 1997) also considers these types of loans as "problem loans". Thus these descriptions are used interchangeably throughout the study. Generally, loans that are outstanding in both principal and interest for a long time contrary to the terms and conditions contained in the loan contract are considered as non-performing loans. This is because going by the description of performing loans above, it follows that any loan facility that is not up to date in terms of payment of both principal and interest contrary to the terms of the loan agreement, is non-performing. Available literature gives different descriptions of bad loans. Some researchers noted that certain countries use quantitative criteria for example number of days overdue scheduled payments while other countries rely on qualitative

norms like information about the customer's financial status and management judgment about future payments (Bloem and Gorter, 2001).

Alton and Hazen (2001) described non-performing loans as loans that are ninety days or more past due or no longer accruing interest (Caprio and Klingebiel 1999), cited in Fofack (2005), consider non-performing loans as loans which for a relatively long period of time do not generate income, that is the principal and or interest on these loans have been left unpaid for at least ninety days. A non-performing loan may also refer to one that is not earning income and full payment of principal and interest is no longer anticipated, principal or interest is ninety days or more delinquent or the maturity date has passed and payment in full has not been made (Fofack, 2005). A critical appraisal of the foregoing definitions of bad loans points to the fact that loans for which both principal and interest have not been paid for at least ninety days are considered non-performing.. Therefore any loan that is outstanding for ninety days or more is considered a non-performing loan. According to (Berger and De Young 1997), such loans could be injurious to the financial performance of banking institutions.

2.4 Measurement of non-performing loans

In recent years the global financial crisis and the subsequent recession in many developed countries have increased households' and firm defaults, causing significant losses for banks Khon and Best (2007). In this study the non-performing loans will be measured based on banks internal factors and customer related factors.

2.5 Banks' internal factors causing non-performing loans

These internal factors affect lending behavior of the bank. Many literature review have examined the connection between these factors and NPLs in KCB Bank Kenya Limited. Literature on banks internal factors that affects non-performing loans are reviewed in the following Bank's loan supervision capacity

The impact of bank's loan supervision capacity on NPLs is extensively documented in the literature. In fact, several studies report that bank's loan supervision capacity is positively related to NPLs (Abafita, 2003, Aballey; 2009, Kagimba; 2010). According to these studies the relationship means that a good supervision capacity contributes to lower non- performing loans and bad supervision capacity increases non- performing loans

Asset Quality

According to Grier (2007), "poor asset quality is the major cause of most bank failures". A most important asset category is the loan portfolio; the greatest risk facing the bank is the risk of loan losses derived from the delinquent loans. The credit analyst should carry out the asset quality assessment by performing the credit risk management and evaluating the quality of loan portfolio using trend analysis and peer comparison. Measuring the asset quality is difficult because it is mostly derived from the analyst's subjectivity.

Management Quality

Management quality is basically the capability of the board of directors and management, to identify, measure, and control the risks of an institution's activities and to ensure the safe, sound, and efficient operation in compliance with applicable laws and regulations William F. Caton, (1997) The top management with good quality and experience has preferably excellent reputation in the local communication. Management relates to the competency of the bank's managers, using their expertise's to make subjective judgments, create a strategic vision, and other relevant qualities. Management is the key variable which determines a banks" success. The evaluation of the management is the hardest one to be measured and it is the most unpredictable (Golin, 2001).

Liquidity

There should be adequacy of liquidity sources compared to present and future needs, and availability of assets readily convertible to cash without undue loss. The fund management practices should ensure an institution is able to maintain a level of liquidity sufficient to meet its financial obligations in a timely manner; and capable of quickly liquidating assets with minimal loss. The liquidity ratio expresses the degree to which a bank is capable of fulfilling its respective obligations. Banks makes money by mobilizing short-term deposits at lower interest rate, and lending or investing these funds in long-term at higher rates, so it is hazardous for banks mismatching their lending interest rate (Holger, 2008).

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Return on Asset

It is an important indicator of the performance of a bank since it determines the profitability of the bank based on its assets. Growing NPLs slowdown interest earning capacity due to their non-recognition of interest and, on the other hand, provision for NPLs increases interest suspense but reduces realized profits. In the context of emerging market economics, the findings of Godlewski (2004) indicated that there is a negative impact of return on assets on the level of non-performing loans.

Capital Adequacy

One of the examined financial factors is the capital adequacy ratio. It measures the risk that a bank can undertake. Capital adequacy ratio is calculated by adding tier 1 capital to tier 2 capital and dividing by risk weighted assets which is guided by Basel accord. Generally, capital adequacy ratios widely used in similar studies are not clear whether they affect positively or negatively to the aggregate NPLs (Sinkey and Greenawlat 1991). According to Mukherjee (2003), the presence of large amount of NPLs is responsible for the decline in the profit margin of many banks.

Bank size

Rajan & Dahl (2003) in their study of commercial banks in India they used panel regression analysis. Their study also indicates that bank size have significance on occurrence of NPLs. Sala & Saurina (2003) indicated that bank size is among the factors that explained variations in NPLs for Spanish banks. Besides, Bikker & Hu (2002) also shows that bank size is significantly related rate of occurrence of loan default.

Loan Growth

Many studies indicate that loan delinquencies are associated with rapid credit growth. Keeton (1999) used data from commercial banks in the United States from 1982 to 1996 and a vector auto regression model indicates this association between loan and rapid credit growth. Sinkey and Greenwalt (1991) also studied large commercial banks in the US and found out that excessive lending explains loan loss rate. Study of Bercoff et al (2002) shows that asset growth explains NPLs.

Interest rate

The commercial banks that charge high interest rate would relatively face a high loan default rate. A study by Waweru & Kalini (2009) on commercial banks in Kenya using statistical analysis

indicates that high interest rate charged by the banks is one of the internal factors that leads to incidence of non-performing loans. Bikker & Hu (2002) on 29 OECD countries, banks profit margin demonstrated by high interest rate affects occurrence of NPLs. In fact several studies report that high interest rate and non- performing loans are positively related (Sinkey and Greenwalt, 1999, Ewert, schenk and Szczesny, 2000, Fofack, 2005, Jimenez and Saurina, 2005, Mwakoba, 2011). The explanation provided by the literature is that banks charge high interest rates when they perceive higher risk of default. This situation attracts bad borrowers to borrow, therefore, increasing chances of loan default. Conversely, banks charge low interest rate when they perceive low risk of default. This causes more borrowers to borrow money from banks.

Lending rates

Lending rates are one of the essential financial determinant of nonperforming loans/bad credits. According to Glen and Mondragon-Velez (2011), changes of lending rate will influence the capacity of borrowers to continue paying interest for the loan borrowed. When economies develop strongly, bank will not anticipate abnormal deterioration in their credit portfolio execution. This is because only a small portion of loans will go default. However, in the event that the recession happens, borrowers may not be able to pay for the interest of the loan borrowed, so at this time the probability of default in loan increases. In this way, they accept that loan default positively related to lending rate.

2.6 Customers related factors

These are factors affecting loan repayment behavior of the borrowers. Customer failure to disclose vital information during the application process leads to occurrence of non-performing loans (Brown Bridge 1998). The following are some of the customer specific factors; diversion of funds by the borrower from the intended purpose, death of the borrower, loss of a job, age and gender among other factors contributes to loan.

Credit Information

Adequate and timely information that enables a satisfactory assessment of the creditworthiness of borrowers applying for a bank loan is crucial for making prudent lending decisions. Prudent lending decisions made on the basis of adequate information on the creditworthiness of borrowers are one of the principal factors in ensuring the financial soundness of banks (Wondimu, 2007). But, there has been serious difficulty in Ethiopia of getting accurate and timely information on

prospective borrowers that facilitates the making of such prudent lending decisions. One of the means for alleviating this difficulty of getting accurate and timely information on prospective borrowers is the establishment of a Credit Information Center (CIC) where relevant information on borrowers is assumed to be pooled and made available to lending banks (Abdu, 2004). According to article 36 of the Licensing and Supervision of Banking Business Proclamation No. 84/2002, the National Bank Ethiopia (NBE) has issued these directives to establish such a Credit Information Center (CIC). Though there is still serious limitations in the accuracy of the credit information extracted the summary of the directive is as follows:

Credit Process

The fundamental objective of commercial and consumer lending is to make profitable loans with minimal risk. Management should target specific industries or markets in which lending officers have expertise. The credit process relies on each bank's systems and controls to allow management and credit officers to evaluate risk and return tradeoffs (Charles Smithson, 2003).

Credit Approval and Implementation

The individual steps in the credit approval process and their implementation have a considerable impact on the risks associated with credit approval. The quality of credit approval processes depends on two factors, i.e. a transparent and comprehensive presentation of the risks when granting the loan on the one hand, and an adequate assessment of these risks on the other. Furthermore, the level of efficiency of the credit approval processes is an important rating element. Due to the considerable differences in the nature of various borrowers and the assets to be financed as well as the large number of products and their complexity, there cannot be a uniform process to assess credit risks (Holger**,** 2008).

2.7 Macroeconomic factors

Large number of the literatures indicates the linkage between the phases of the business cycle with banking stability. Macroeconomic stability and banking soundness are inexorably linked. Economic theory and other evidences strongly indicate that instability in the macroeconomic is associated with instability in banking and financial markets and vice versa. The relation between the macroeconomic environment and loan quality has been investigated in the literature linking the phase of the business cycle with banking stability. In this line of research the hypothesis is formulated that the expansion phase of the economy is characterized by a relatively low number

of NPLs, as both consumers and firms face a sufficient stream of income and revenues to service their debts. However as the booming period continues, credit is extended to lower-quality debtors and subsequently, when the recession phase sets in, NPLs increase (Fisher 1999).

Gross Domestic Product (GDP)

According to Salas and Saurina (2002) there is a significant negative concurrent effect of GDP growth on the NPL ratio and infer a quick transmission of macroeconomic developments to the ability of economic agents to service their loans. The clarification given by the writing for this relationship is that, Changes in business cycle affect the credit value of borrowers in terms of reimbursement capacity. Consequently, solid positive development in genuine GDP as a rule interprets into more pay which makes strides the obligation overhauling capacity of borrower which in turn contributes to lower NPLs. Then again, when there is moderate down in the economy low or negative GDP development), the financial exercises in common are diminishing and the volume of cash held for either businesses or families is diminishing. These conditions contribute in falling apart the capacity of borrowers to reimburse the advances, which lead to increment the probability of delays their budgetary commitments and hence banks" introduction to credit hazard increment. In this respect, Hou (2006) famous that, each NPL in the monetary division is seen as a front-side reflect picture of a sickly unbeneficial venture.

Inflation:

Like GDP and exchange rates, inflation influences borrower's obligation overhauling capacity through diverse channels and its affect on NPL can be positive or negative (Fofack 2005, Pasha and Khemraj (2009) and Nkusu 2011). The clarification given by the writing for this relationship is that, higher expansion can make obligation overhauling less demanding by decreasing the genuine esteem of extraordinary advances especially when the credit rates are settled (banks do not adjust rates in understanding to the inflation alter to preserve their genuine returns). However, it can additionally weaken some borrower's potential to provider debt by means of reducing real income. Besides, when advance rates are variable(adjusted in understanding to the inflation alter), inflation is likely to diminish borrower's advance overhauling capacity as lenders alter rates to preserve their genuine returns or essentially to pass on increments in arrangement rates coming about from financial approach activities to combat expansion. Against this foundation, the relationship between NPL and inflation can be positive or negative.

Exchange Rates

Exchange rate are influences borrower's obligation overhauling capacity through diverse channels and its affect on NPL can be positive or negative (Nkusu 2011). As famous in Pasha and Khemraj (2009), deterioration of the trade rate can have blended suggestions on borrower's obligation overhauling capacity. On the one hand, it can progress the competitiveness of export-oriented firms. As long as the esteem of household money deteriorated (lower), export-oriented firms can rule the worldwide showcase at lower cost (since their production fetched is secured in household money which has lower esteem than foreign currency and their income is collected in foreign cash which has higher esteem as compared to the residential cash. Subsequently, devaluation of trade rate can move forward the debt-servicing capacity of export-oriented borrowers. On the other hand, it can unfavorably influence the debt-servicing capacity of borrowers who borrow in outside cash (import-oriented firms).

2.8 Empirical Studies

In this part the study will discussed an empirical studies conducted by several authors both in Ethiopia and outside of Ethiopia. Shingjergji (2013) studied the impact of different bank specific factors on non-performing loans of Albanian banks by taking quarterly data from 2002-2012. Dependent variable used in the study is non-performing loans (NPLs) while independent variables include capital adequacy ratio (CAR), loan to asset ratio (LTA), return on equity (ROE), natural log of total loans, and natural log of net interest margin (NIM). Regression results obtained by using ordinary least square revealed negative insignificant relation of CAR with NPLs. Relation of loan to asset ratio has been found negative but total loans level is positively influencing the NPLs means increased loans level will result in increased level of NPLs. On the other hand, NIM and ROE are negatively linked with NPLs depicting that high NPLs deteriorate the performance of banks (Kirui, 2014).

Louzis *et al.,* (2010) conduct study to examine the determinants of NPLs in the Greek financial sector using fixed effect model from 2003-2009 periods. The variables included were ROA, ROE, solvency ratio, loan to deposit ratio, inefficiency, credit growth, lending rate and size, GDP growth rate, unemployment rate and lending rates. The finding reveals that loan to deposit ratio, solvency ratio and credit growth has no significant effect on NPLs. However, ROA and ROE has negative significant effect whereas inflation and lending rate has positive significant effect on NPLs. It

justifies that performance and inefficiency measures may serve as proxies of management quality (Gadise, 2014).

Ranjan & Chandra (2003) analyze the determinants of NPLs of commercial banks' in Indian in 2002. The objective of the study was to evaluate how NPLs influenced by financial and economic factors and macroeconomic shocks. In the study, they utilized panel regression model and found that lending rate also have positive impact on the NPLs justifying that the expectation of higher interest rate induced the changes in cost conditions to fuel and further increase in NPLs. Besides, loan to deposit ratio had negative significant effect on NPLs justifying that relatively more customer friendly bank is most likely face lower defaults as the borrower will have the expectation of turning to bank for the financial requirements (Gadise, 2014).

Salas and saurian (2002) investigated the determinates of problem loans of Spanish commercial and saving banks using a dynamic model and panel dataset covering the period 1985-1997. The finding of the study was that real growth in GDP, rapid credit expansions, bank size, capital ratio and market power all explain variation in non-performing loans with a panel dataset covering the period 1996-1999, used a regression analysis and analyzed the relationship between NPLs and ownership structure of commercial banks in Taiwan. The study showed that banks with higher government ownership recorded lower non-performing loans. The finding of the study showed that bank size is negatively related to NPLs while diversification may not be determinant. This study was only limited to commercial banks of Taiwan.

Tomak (2013) conducted study on the "Determinants of Bank's Lending Behavior of commercial banks in Turkish" for a sample of eighteen from 25 banks. The main objective of the study was to identify the determinants of bank`s lending behavior. The data was covered 2003 to 2012 periods. The variables used were size, access to long term funds, interest rates, GDP growth rate and inflation rate. The finding reveals that bank size, access to long term loan and inflation rate have significant positive impact on the bank`s lending behavior but, interest rates and GDP are insignificant (Gadise, 2014).

Wambugu (2010) sought to determine the relationship between non-performing loans management practices and financial performance of commercial banks in Kenya and he use a causal design, and population of all 43 commercial banks in Kenya. The study concluded that there is need for commercial bank to adopt non-performing loans management practices. Such practices include;

ensuring sufficient collaterals, limiting lending to various kinds of businesses, loan securitization, ensuring clear assessment framework of lending facilities and use of procedures in solving on problematic loans among others. This study used causal effect design to study the relationship between non-performing loans which was the independent variable and financial performance which was the dependent variable. However, the study did not determine the effect of non-performing loans on financial performance.

Hong and Sung (1995) have tried to analyze Korean banks' performance which was reflected on their financial statements and to provide some comments to improve their banking business. The study was carried out by comparing the eight Korean banks' past five years performance results with other banks in the State of California, other banks include Asian banks other than Korean banks owned by such Asians (e.g., Chinese and Japanese) and American banks owned by other ethnic groups of Americans (e.g., "white" American). The comparative financial analysis indicated that Korean banks were relatively conservative in managing operations and lending and were more actively involved in their services for international business and sales activities. The analyses also indicated that the Korean banks' loan quality was relatively low and their loan market appears to have been saturated. They recommend on the basis of the analysis that the Korean banks should adopt a more active marketing strategy to expand and create their own market, consider tighter control for their operations with understanding banking regulations (e.g., Financial Institutions Reform, Recovery, and Enforcement Act) and adopt the loan policy in a way that they can make a loan decision with more reliable cash flow analysis.

Abdus (2004) has examined empirically the performance of Bahrain's commercial banks with respect to credit (loan), liquidity and profitability during the period 1994-2001. Nine financial ratios (Return on Asset, Return on Equity, Cost to Revenue, Net Loans to Total Asset, Net Loans to Deposit, Liquid Asset to Deposit, Equity to Asset, Equity to Loan and Non-performing loans to Gross Loan) were selected for measuring credit, liquidity and profitability performances. By applying these financial measures, this paper found that commercial banks' liquidity performance was not at par with the Bahrain banking industry. Commercial banks are relatively less profitable and less liquid and, are exposed to risk as compared to banking industry. With regard to asset quality or credit performance, this paper found no conclusive result. Non-performing loans to gross loans (NPLGL) indicates that there was no difference in performance between the commercial banks and the banking industry in Bahrain. Chowdhury and Ahmed (2007) have tried to analyze

19

the development and growth of selected private Commercial Banks of Bangladesh. It was observed that all the selected private commercial banks were able to achieve a stable growth of branches, employees, deposits, loans and advances, net income and earnings per share during the period of 2002-2006. Seven trend equations have been tested for different activities (growth in branch, employees, deposits, loans and advances, net income and earnings per share) of the private commercial banks. Among them the trend value of branches, employees, deposits and net income, were positive in case of all the selected banks. The above empirical review of literature emphasizes that all the studies so far conducted are mainly discussing the loan recovery problems, determinant factors for default of borrowers in financial institutions in general at Macro-level (Bloem, and Gorter ,2001).

2.9 Knowledge Gap Analysis

The knowledge gap analysis of this study was done based on the studies conducted in Ethiopia. Accordingly, the study were assessed several published and unpublished research result related to NPL. There some few studied conducted in Ethiopia regarding the studied areas such as, a study conducted by Negera (2012) sought to find out the determinants of non-performing loans in the case of Ethiopian banks, using a causal design and a population of all banks in Ethiopia were include in the study. The findings of the study shows that poor credit assessment, failed loan monitoring, under developed credit culture, lenient credit terms and conditions, aggressive lending, compromised integrity, weak institutional capacity, unfair competition among banks, willful default by borrowers and their knowledge limitation, fund diversion for unintended purpose, over/under financing by banks ascribe to the causes of loan default. However the study did not consider the relationship between non-performing loans, indicate determinates of NPL using empirical data rather the study were depend on primary data like questioner and interview.

Habtamu (2015) sought to find out bank specific factors affecting occurrence of NPLs in Ethiopian private banks. A survey study research design of six private Banks was employed in his study. Accordingly the findings of the study shows that the major factors affecting NPLs were poor credit assessment, poor loan follow up, undeveloped credit culture, lenient credit terms and conditions, knowledge limitation, compromised integrity, unfair competition among banks, fund diversion for unintended purpose, shareholders influences are bank specific factors ascribed to the occurrence of loan default. On the other hand the finding of the document does not support that Bank size,

credit growth, and interest rate charged by banks have relationship with the occurrence of non-performing loans. Based on the opinion of the respondents and interviewees" argument, the findings shows that occurrence of NPLs had high influence on the profitability of banks and it scarce the existence of credit of banks to the needy customers. The study focused on bank specific factors affecting occurrence of NPLs in Ethiopian private banks. However the study did not consider the relationship between non-performing loans and major internal and external factors that determine non- performing loan.

2.10 Conceptual Framework

The conceptual frame work which describes the relationship between NPL with internal bank factors and macroeconomic factors based on the theoretical and empirical perspectives was formulated as follows:-

Figure 1 conceptual framework

Dependent variable   **Independent variables**
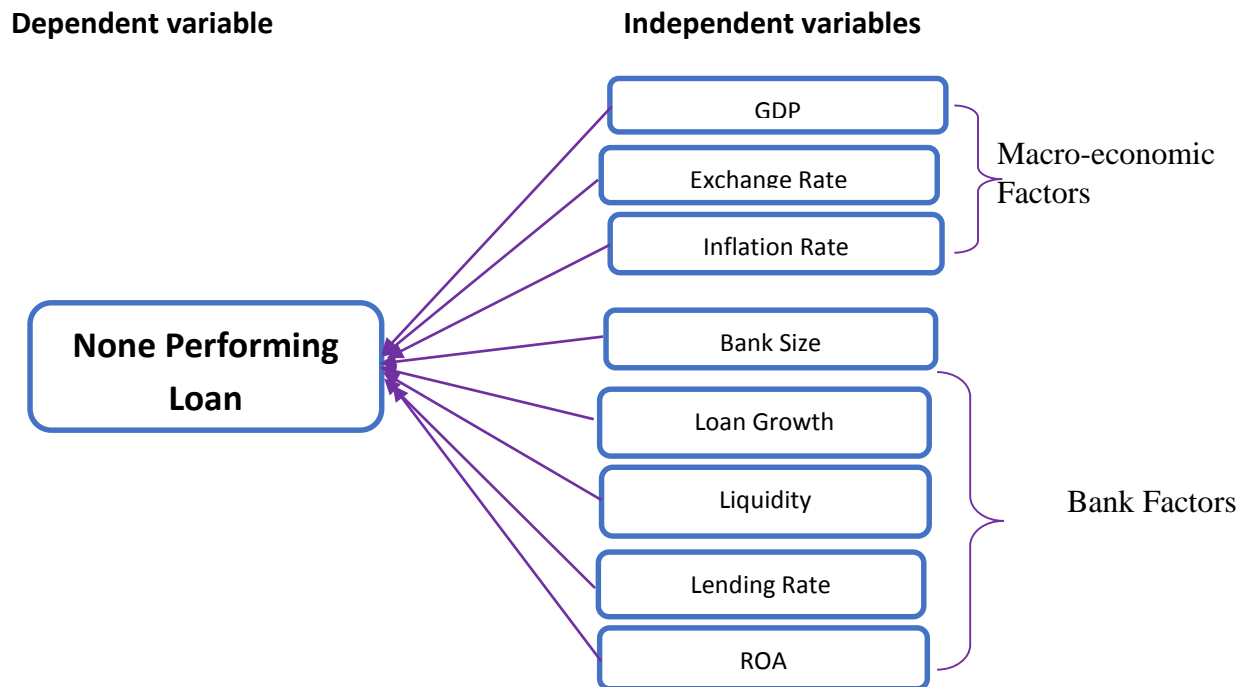
CHAPTER THREE

Research Methodology and Design

3. Introduction

This study aims to examine the determinants of NPLs in the commercial banks found in Ethiopia. Accordingly, this chapter discussed the research procedure that is used to carry out this study. In case, it starts by discussing research design followed by the nature and instruments of data collection and sampling design. The subsequent section presents and discusses method of data process and analysis.

3.1. Research Design

The essential point of this examination was to examine the determinants of NPLs in Ethiopian commercial banks with a specific end goal to achieve the objective, explanatory and descriptive type of research design was employed. This type of research design helps to identify and evaluate the causal relationships between the different variables under consideration (Creswell, 2009). So, the explanatory and descriptive research design was employed to examine the relationship of the dependent and independent variables and also the present study enabled to describe the trend of variables from the years 2002 to 2016.

3.2 Data sources and types of data

The types of data that used in this study are panel data and Quantitative in nature. Balanced panel data meaning that each cross sectional units have same number of time series observations. The study has highly focused on secondary data source from the audited annual financial report (2002 – 2016) from National Bank of Ethiopia and MOFEC, journals, articles, internet and books, online information which is relevant to explain the factors affecting bank's NPL.

3.3 Population Sampling Technique of the Study

In this research, the target population is the banking sector in Ethiopia. According to NBE annual report (2015/16), Ethiopia consists of 17 Commercial banks. Commercial Bank of Ethiopia (CBE), Dashen Bank S.C (DB), Awash International Bank S.C (AIB), Wogagen Bank S.C (WB), United Bank S.C (UB), Nib International Bank S.C (NIB), Bank of Abyssinia S.C (BOA), Lion International Bank S.C (LIB), Cooperative Bank of Oromia S.C (CBO), Berehan International Bank S.C (BIB), Buna International Bank S.C (BUIB), Oromia International Bank S.C (OIB),

Zemen Bank S.C (ZB), Abay Bank(AB),Addis International Bank(ADIB), Debub Global Bank(DGB) and Enat Bank (EB).

Commercial Banks of Ethiopia categorized into three peer groups. It is based on the establishment period and asset sizes of the banks. A large bank is the first category, there is only one banks that is Commercial Bank of Ethiopia (CBE), The second peer group is middle banks, under this category there is five medium banks which are Awash, Dashen, Abyssinia, Wegagen, United and Nib Banks. The final peer group is small banks; this group is relatively small in asset size, which is Cooperative bank of Oromia, Oromia International Bank, Lion, Zemen, Bunna, Berhan, Abay, Addis, Enate and Debub Global Banks. The study were consider large and medium banks, to get fair output of the industry, accordingly, the researcher select one large bank and from 16 total private commercial banks 6 of them were selected from medium peer groups.

The study also used purposive sampling technique, because purposely select one government bank and six private commercial banks of Ethiopia according to their prior experience in Ethiopia, this is because, the banks have better experience in lending and having lot of customers than the rest banks. In such manner the study was include, Commercial Bank of Ethiopia, Awash Bank, Dashen Bank, Bank of Abyssinia, United Bank, Nib International Bank, and Wegagen Bank, The researcher believed that the sample size is adequate to make sound conclusion. The selected banks establishment period are shows in the below table:

Table 2 List of selected Banks

Name Of Banks	Year of Establishment
Commercial Bank of Ethiopia	1963
Awash International Bank	1994
Dashen Bank	2003
Bank of Abyssinia	1996
United Bank	1998
Nib International Bank	1999

| Wegagen Bank | 1997 |

From Wikipedia, the free encyclopedia

3.4 Methods of Data Analysis

After collecting the relevant data through the data gathering methods that will use in this study, the researcher will categorize the data appropriately for interpretation to achieve the stated objectives. In this study two type of statistical analysis were used to test the proposed hypotheses. These are descriptive statistics and inferential statistics to see the cause and effect relationship between the dependent and independent variables. The descriptive statistics of both dependent and independent variables were calculated over the sampled periods. This helps to convert the raw data in to a more meaning full form which enables the researcher to understand the ideas clearly. Then, correlation analyses between dependent and independent variables were made and finally a multiple linear regression analysis and diagnostic test was used to determine the relative importance of each independent variable in influencing NPLs of Ethiopian commercial banks by using E-views 9 software.

3.5 Description of Variables

The studies had both dependent and independent variables and explain character before, designing model specification of variables.

3.5.1 Dependent Variables

Non-performing loans (NPLs) means loans & advances whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with the contractual repayment term of the loan or advance is in question (NBE directive No SBB/43/2008). The rise of non-performing loan portfolios in banks significantly contributed to financial distress in the banking sector. NPLs can be determined both Macro and Internal determinant variables of the bank. Below the study tried to explain both macro and internal bank factors or independent variables.

3.5.2 Independent Variables

Bank size (BS): Too big to fail hypothesis assumes that large banks take excessive risks by increasing their leverage too much and extend loans to lower quality borrowers, and therefore have more NPLs. Some researchers such as (Salas and Saurina, 2002) found a negative relation between bank size and NPLs and argued that bigger size allows for more diversification opportunities. We

expect a positive effect of size on NPLs. In order to emphasize this possible non-linear relationship, as a proxy the study use the logarithm of banks total assets.

H1: There is positive relationship between bank size and NPLs:

Exchange rate (EXR): No one can predict what the exchange rate will be in the next period, it can move in either upward or downward direction regardless of what the estimates and predictions were. An appreciation of exchange rate can have mixed effects. It may weaken the competitiveness of export-oriented firms and adversely affect their ability to pay their debts (Fofack, 2005) .However; it may improve the debt servicing capacity of borrowers whose loans are in foreign currencies. So, the relationship between EXR and NPL may be mixed. An increase in the EXR is expected to decrease nonperforming loan ratio.

H2: There is a negative relation between EXR and NPLs

Economic growth (GDP): There is a significant empirical evidence of negative association between economic growth and non-performing loans (Farhan et al. 2012). Carey (1998) argues that the state of the economy is the most important factor affecting diversified debt portfolio loss rates. Salas and Saurina (2002) found a significant negative effect of GDP growth on NPLs. Economic growth usually increases the income which ultimately enhances the loan payment capacity of the borrower which in turn contributes to lower bad loan and vice versa (Khemraj and Pasha, 2009). Accordingly we expect a negative effect of economic growth on NPLs.

H3: There is negative relationship between GDP and NPL

Inflation rate (INF): many researchers such as (Khemraj and Pasha, 2009) and (Fofack, 2005) found a positive relationship between the inflation and NPLs. While Nkusu, (2011) argued that inflation can affects the borrowers loan payment capacity positively or negatively, higher inflation can enhance the loan payment capacity of borrower by reducing the real value of outstanding debt; moreover increased inflation can also weaken the loan payment capacity of the borrowers by reducing the real income when salaries are sticky. So according to literature relationship between inflation and nonperforming loans can be positive or negative depending on the economy of operations (Farhan et al. 2012).

H4: There is a positive/Negative relationship between INF and NPL

Loan Growth: The loan is typically the largest asset and the prevail source of revenue.

Since loans are illiquid assets, increase in the amount of loans means increase in illiquid assets in the asset portfolio of a bank. As it was made by various empirical studies this study expected positive relationship between banks loan growth and NPLs. (Keeton, 2003) showed a strong relationship between credit growth and damaged assets.

H5: There is positive relationship between loan growth and NPLs.

Liquidity (LIQ): High ratio of liquidity may send a positive signal to the depositors that the bank is liquid; hence, higher ratio is the depositors' confidence. However, a lower value of this ratio may signal that a bank is not in a good situation. On the other hand, higher liquidity may also imply the inefficient utilization of resources therefore may be associated with a high probability of failure. A higher ratio of liquid assets to total assets implies a greater capacity to discharge liabilities, and is therefore associated with a higher survival time. Thus the study hypothesized that

H6: There is significant positive / negative relationship between Liquidity and NPLs of commercial banks

Lending rate (LR): Lending rates denote the weighted average interest rates on loans and advances. Many empirical evidence such as (Nkusu, 2011), (Adebola te al., 2011) and (Berge and Boye, 2007) found a positive correlation between lending rate and NPLs. An increase in interest rate weakens loan payment capacity of the borrower therefore non-performing loans and bad loans are positively correlated with the interest rates (Nkusu, 2011). (Farhan et al. 2012) argued that banks with aggressive lending policies charging high interest rates from the borrowers incur greater non-performing loans. We expect a positive effect of lending rates on NPLs.

H7: there is a Positive Relationship between LR and NPLs

Return on Asset (ROA): The ROA reflects the ability of a bank's management to generate profits from the bank's assets. It shows the profits earned per birr of assets and indicates how effectively the bank's assets are managed to generate revenues. This is probably the most important single ratio in comparing the efficiency and operating performance of banks as it indicates the returns generated from the assets that bank owns.(Getahun, 2015). Thus the study hypothesized that

H8: There is significant positive relationship between NPLs and ROA

3.6 Model Specification

In establishment of the relationship between study variable comprising of independent variables including size of the banks, exchange rate, GDP, Inflation rate, Loan growth, Liquidity, Lending rate and Return on Asset. The regression model was as follows based on this to analyze the cause effect relation the study were developed the following model;

$$Y_i = \beta 0 + \beta_1 it + \beta_2 it + \beta_3 it + \beta_4 it + \beta_5 it + \beta_6 it + \beta_7 it + \beta_8 it + \varepsilon_i$$

Where: - Y_{it} is the dependent variable for firm 'i' in year 't', $\beta 0$ is the constant term, β is the coefficient of the independent variables of the study, X it is the independent variable for firm 'i' in year 't' and ε_{it} the normal error term.

Thus, this study is based on the conceptual model adopted from Fawad and Taqadus (2013). Accordingly, the estimated models used in this study are modified and presented as follow;

$$NPL = \beta 0 + \beta 1(SIZE)it + \beta 2(EXR)it + \beta 3(GDP)it + \beta 4(INFR)t + \beta 5(LG)it + \beta 6(LIQ) it + \beta 7(LR)it + \beta 8(ROA)it + \varepsilon it$$

Where;

- β_0 is an intercept
- $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6,$ and β_7 represent estimated coefficient for specific bank *i* at time *t ,*
- BS, EXR, GDP, INFR, LG, GDP, LIQ, LR and ROA represent Size of banks, exchange rate, gross domestic products, inflation rate, loan growth, liquidity, lending rate and return on asset, respectively ε_{it} represents error terms for intentionally/unintentionally omitted or added variables.

CHAPTERFOUR

Data Analysis and Interpretation

4. Introduction

This core chapter deals with the discussion and analysis of data collected from the sampled banks annual publications of the national bank of Ethiopia (NBE) and each commercial banks audited annual financial reports. The audited financial statements of the banks over the study period has been obtained from National Bank of Ethiopia, (which is responsible for maintaining the audited financial statements of all banks operating in the country and regulate their operating activities), the country's central bank. Basically, the balance sheet and income statements were the main sources of the relevant data to address the stated objectives of the study. Based on this the study were analyzed in two major sections. The first section describes determinates of commercial banks non – performing loan using percentage ratio and the second section presented the correlation and regression analysis to determine cause effect relationship between dependent and independent variables.

4.1. Descriptive statistics

In this part the study discussed both dependent and independent variables. The dependent variable of the study is NPLs of Ethiopian commercial banks in Ethiopia. On the other hand the independent variable of the study consider both Macro – economic determinates such as GDP, Inflation rate, and Exchange rate, while, the internal determinate factors considered in the study were Bank size, Loan growth, Liquidity, Lending rate and Return on asset.

4.1.1 Trend of Non – Performing Loan (NPLs)

In this study, NPL is measured by the share of non-performing loans from the total loans & advances of the bank. The National Bank of Ethiopia has provided direction to all commercial banks to maintain the NPL ratio below 5%. The below table implied trend of non –performing loan at each bank level.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg
CBE	0.246	0.290	0.244	0.212	0.177	0.142	0.061	0.031	0.018	0.025	0.022	0.026	0.028	0.024	0.027	0.105
AB	0.038	0.055	0.077	0.062	0.049	0.043	0.046	0.055	0.047	0.036	0.027	0.023	0.023	0.017	0.015	0.032
DB	0.031	0.039	0.037	0.032	0.027	0.025	0.023	0.023	0.022	0.020	0.021	0.022	0.019	0.017	0.017	0.02
BOA	0.057	0.077	0.076	0.049	0.031	0.047	0.089	0.098	0.074	0.033	0.026	0.020	0.018	0.015	0.014	0.043
WB	0.049	0.051	0.058	0.051	0.048	0.044	0.059	0.061	0.040	0.045	0.024	0.022	0.017	0.016	0.016	0.033
UB	0.012	0.024	0.039	0.039	0.029	0.030	0.027	0.031	0.036	0.028	0.023	0.019	0.014	0.012	0.013	0.023
NB	0.012	0.040	0.038	0.041	0.039	0.034	0.038	0.046	0.039	0.041	0.027	0.025	0.021	0.015	0.018	0.047
Avg	0.063	0.082	0.081	0.069	0.057	0.052	0.049	0.049	0.039	0.032	0.024	0.022	0.020	0.016	0.017	0.032

Source Each Banks Annual report

The trend analysis implied on the above figure that, NPLs performance of the studied banks were decrease from year to years, as implied by the average non performing rate was high in 2003 and 2004, 8.22% and 8.12% respectively in 2015 and 2016 the average performance was decreased relatively with the previous years. This implied that performance of commercial banks increase in collecting the loan from borrowers. However, trend of NPLs performance of each banks were not the same some of the banks perform well while the others not well. Accordingly, at individual bank level the highest percentage ratio of NPLs observed 4.7% in NB, while the lowest were 2.0% in DB. Generally, from the stated data one can deduced that, significant decline of NPLs might imply either improvement in the levels of loan quality or being escaping of banks from providing loan and advances. Even though, the trend implied on the studied years improvement, however,

the average NPLs of the studied banks for the past fifteen years at 3.2% implied still there is a challenge on commercial banks to administrator loan effectively.

Bank Size (SIZE)

Bank size is what the bank possesses and it is useful to measure the banks general capability to undertake its intermediary function. In this study, the proxy used to measure bank size was the natural logarithm of the total asset. Larger banks have the advantage of better access to additional financing, dealing with liquidity problems and diversifying risk. This is probably due to the fact that larger banks benefit from a "too large to fail" policy and are believed to be more likely to survive than smaller banks. The study implied below in the fig. both the average trend of the industries and each of the studied banks size growing trends and their effect on commercial banks NPLs.

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Figure 3 Average natural logarithm of total asset Trend of the Industry

Industry Asset growuth

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AVG trend	3.09	3.2	3.32	3.44	3.55	3.8	3.8	3.91	4	4.1	4.2	4.16	4.35	4.37	4.46
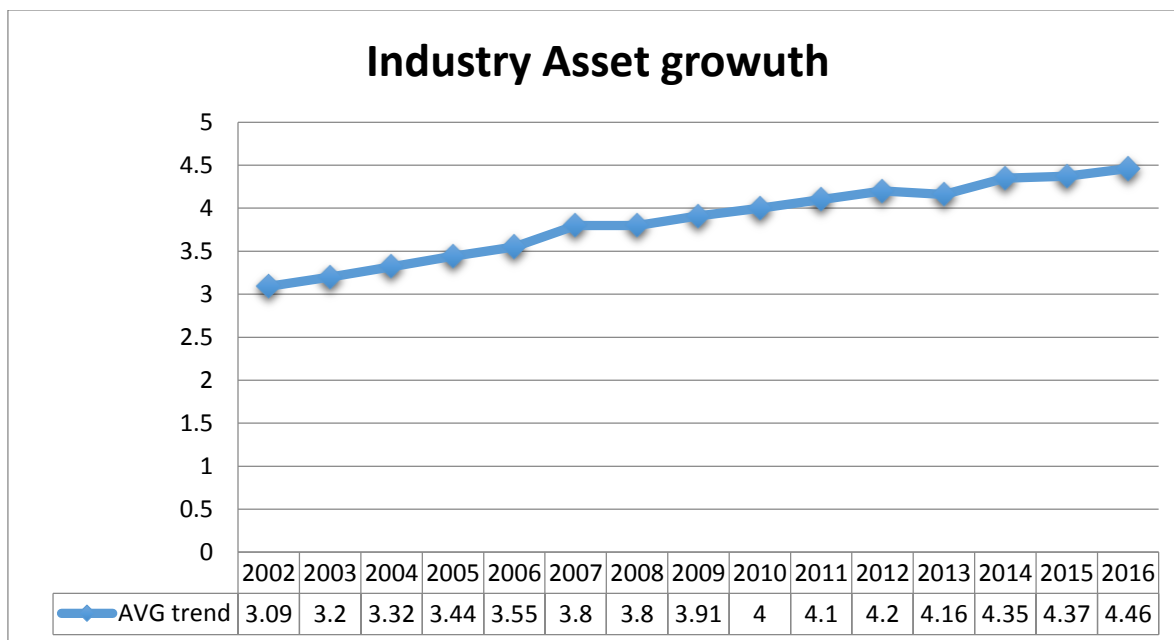
Source Each banks annual Report

The average total assets of Ethiopian commercial banks have shown consistent growth throughout the studied period. Accordingly the maximum total asset was registered in 2016 (4.46%) while the minimum were registered in 2002 which is 3.09%. Hence, the larger bank size induces economy of scale there by making larger banks more profitable and will reduce the cost of gathering and processing information. Since larger banks are more able to solve problems of information

30

asymmetry in comparison to their smaller counterparts. Skilled employees and quality information bases, larger banks are more effective in credit analysis and monitoring their debtors. Therefore larger banks have the positive impact of the banks and the country's economy. Regarding individual banks asset level the growth rate were not consistent some of the studied banks average total asset were grow at a fastest rate while the others were not similarly grown below the graph implied each of the studied banks trend of total asset growth between the studied years.

Figure 4 Average natural logarithm of total asset Trend each banks

Each Banks avg asset growth 2002 -2016

	CBE	AB	DB	BOA	WB	UB	NB	AVG
AVG Asset	4.84	3.78	3.92	3.78	3.52	3.52	3.59	3.87
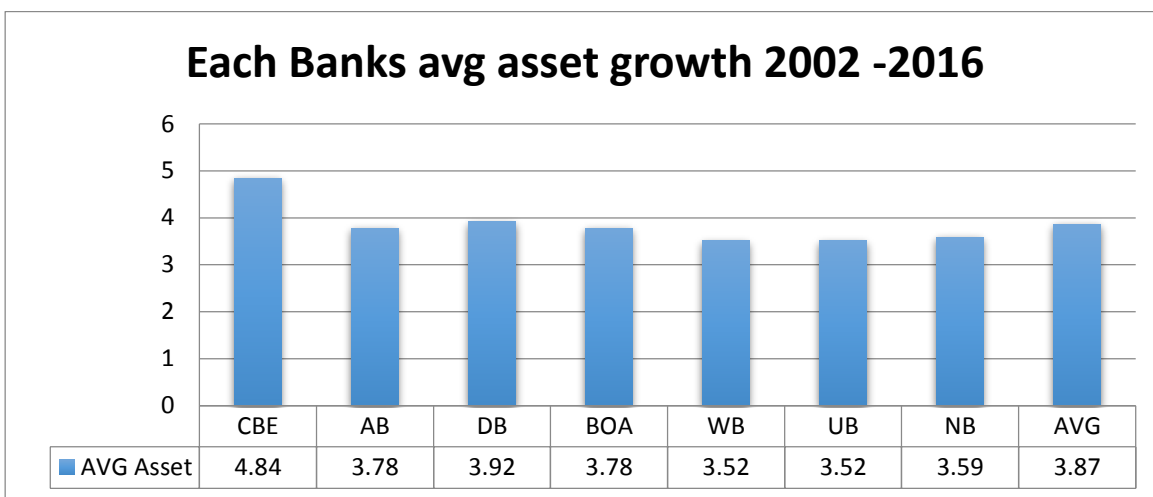
Source Each banks annual Report

The average ratio of total asset growth of each bank for the last fifteen years has similarities except slight asset growth rate score in each bank. Accordingly, maximum average total asset growth rate scored by CBE (4.84%), DB (3.92%), and AB (3.78%), while the minimum average asset growth was observed at UB (3.52%) and NB (3.52%). Totally the studied commercial bank's total asset grows for the past 15 consecutive years 3.87% average growth rate. Therefore, banks asset growth can enhance the NPLs performance of each bank, this is because when asset increase profitability also increase and capacity of the banks increase interims of increasing number of employee, branches, in turn, it increases profitability and the chance of a non-performing loan.

Liquidity Position of studied Banks

The Liquidity position of the studied banks was measured based one Liquid asset/net deposit ratio which indicates the extent to which the bank's total liquid assets are composed of deposits from customers and other financial institutions. The measure implied that liquid assets are cash on hand,

deposits with local and foreign banks and treasury bills and other items compared with liquid assets. On the other hand, the net deposit is composed of demand deposits, savings deposits and time deposits which are liabilities for the bank. One of the liquidity measures of this study is liquid asset-to-deposit and other short-term borrowings ratio. The National Bank of Ethiopia also uses this ratio as the measurement of banks liquidity level and the liquidity requirement directive is based on this ratio. As per NBE directive number SBB/57/2014 issued by the National Bank of Ethiopia, any licensed commercial banks are required to maintain liquid asset not less than 15% of its net current liabilities (which includes the sum of demand deposits, saving deposits, time deposits and similar liabilities with less than one-month maturity).Commercial banks may confront with liquidity deficit when they face a problem of meeting a large amount of demand (withdrawals). A high ratio of liquidity may send a positive signal to the depositors that the bank is liquid; hence, higher is the depositors' confidence. However, a lower value of this ratio may signal that a bank is not in a good situation. On the other hand, higher liquidity may also imply the inefficient utilization of resources, therefore, may be associated with a high probability of failure. A higher ratio of liquid assets to total assets implies a greater capacity to discharge liabilities and is, therefore, associated with a higher survival time. Liquidity is a prime concern for banks and the shortage of liquidity can trigger bank failure. Banking regulators also view liquidity as a major concern. This is because banks without sufficient liquidity to meet demands of their depositors risk experiencing bank run. Holding assets in a highly liquid form tends to reduce income as liquid assets are associated with lower rates of return. Below the study implied both trends of the studied banks average liquid position as well as each banks position of liquidity for the past 15 years

Figure 5 Average Liquidity growth rate and trend of the studied banks from 2002 – 2016

Avg. Liquidity Growth Trend

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	AVG
Liq	39.05	40.05	41.88	38.37	33.04	35.09	38.22	47.49	45.92	42.49	29.7	23.46	22.09	22.78	20.11	34.65
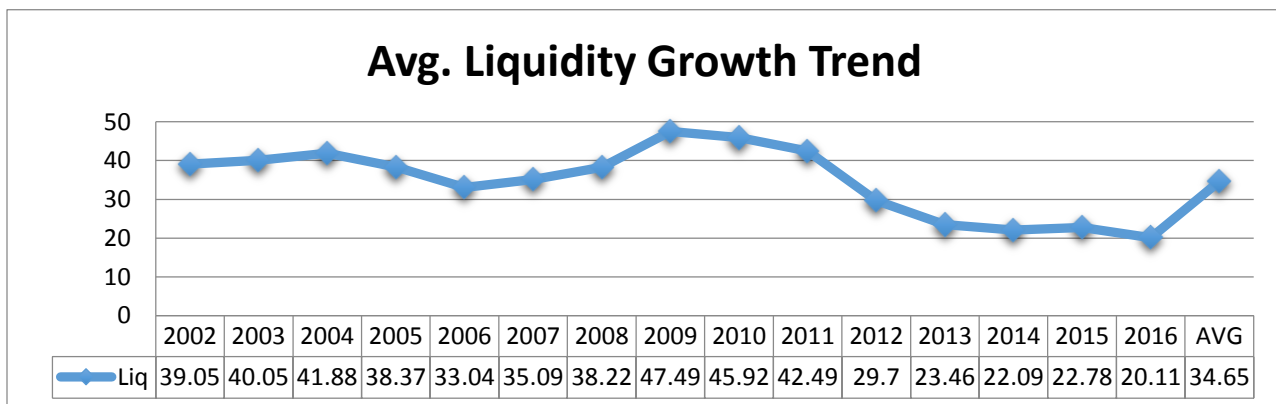
Source Each banks annual Report

The above fig indicated the average liquidity position of the industry were grow from the year 2009 – 2011, however, starting 2012 – 2016 it implied constant declining; it may relate in addition to increasing loan facilities for several sectors the application of 27% NBE bill Purchase regulatory in 2011 may also have its own impact. Generally, average minimum liquidity position of the industry observed in 2016 (20.11%) while the maximum was 47.49% in 2009. The study also assessed each of the studied bank's liquidity position and their growth trend. Accordingly, below the figure implied each of the studied bank's liquidity positions between the studied years.

Figure 6 Average Liquidity growth rate of each banks 2002 – 2016

Each Banks avg growth rate of liquidity 2002 -2016

	CBE	AB	DB	BOA	WB	UB	NB	AVG
■ LIQ	35.13	33.93	32.84	34.6	35.33	37.16	33.55	34.65
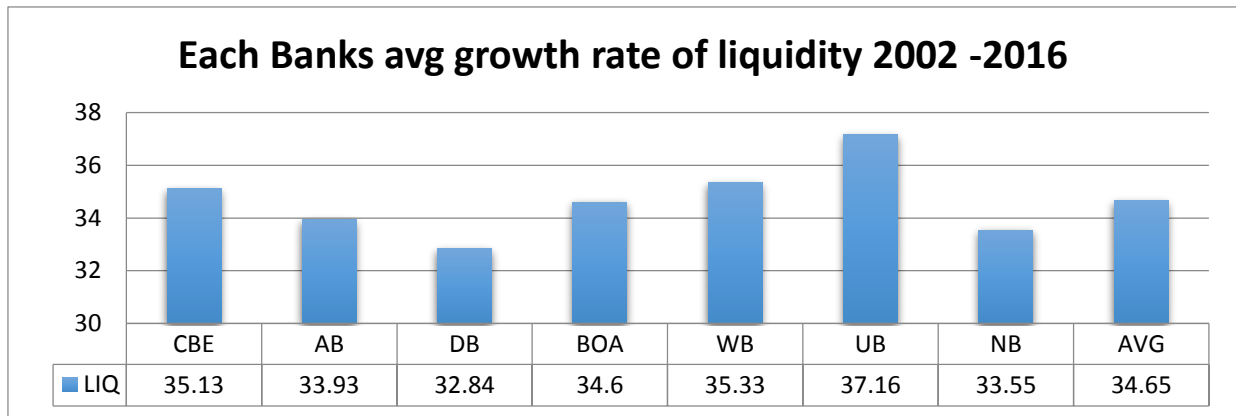
Source Each banks annual Report

As implied from the above figure liquidity position of each bank were not the same accordingly, the average growth rate CBE at 35.13% was the highest of government commercial banks while Dashen bank at 32.84% of average liquidity growth rate recorded the lest among the studied private banks for the last 15 years. Therefore from the result the study deduced that, even though trend of liquidity position becoming to decrease, however, the position of each bank and the total average of the studied banks have engaged bay far NBE requirement of 15%, this implies that the inefficient utilization of resources and loan service by the banks is decline and also not disburse additional loans to the prominent clients to strength the borrower's capacity. The banks and this can affect the performance of loan granting of each bank.

Loan Growth

Hence, the loan is the principal business activity for all commercial banks in Ethiopia and the loan portfolio is the largest asset and the predominant source of revenue. The higher the loan growth

33

has probability the higher profit. The graph implied the trend of the average loan growth rate on the studied banks.

Figure 7 Average Loan growth trend of the studied banks

Loan Growth Rate Trend

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Loan Growth Rate	19.24	38.93	24.54	36.28	41.11	28.33	23.24	4.45	16.2	25.44	37.32	24.77	13.03	22.66	20.91
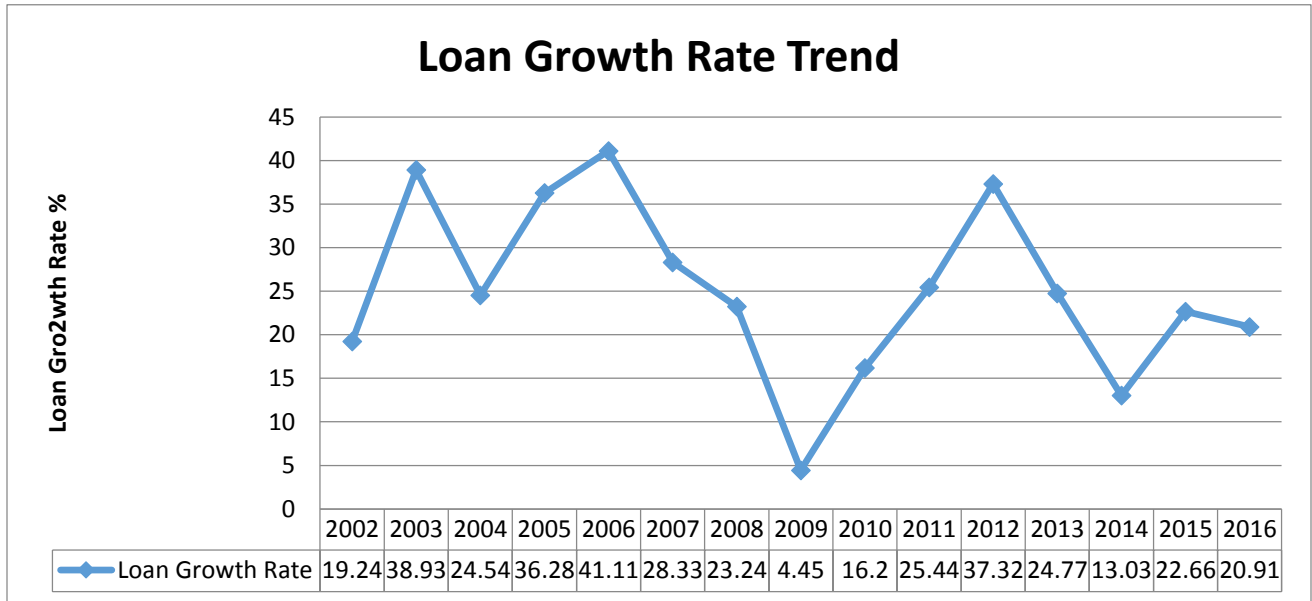
Source Each banks annual Report

The trend shows an increase in loans granted to borrowers throughout the studied years except in the year 2009 decline to 4.45% and which is the minimum average growth rate of the loan, while the maximum loan growth rate was observed in 2006 (41.11%) and 2003 (38.93%). Regarding each of the studied bank's performance the fig. below implied its trend

Figure 8Average LG ratio of each banks performance from 2002 - 2016

Source Each banks annual Report

34
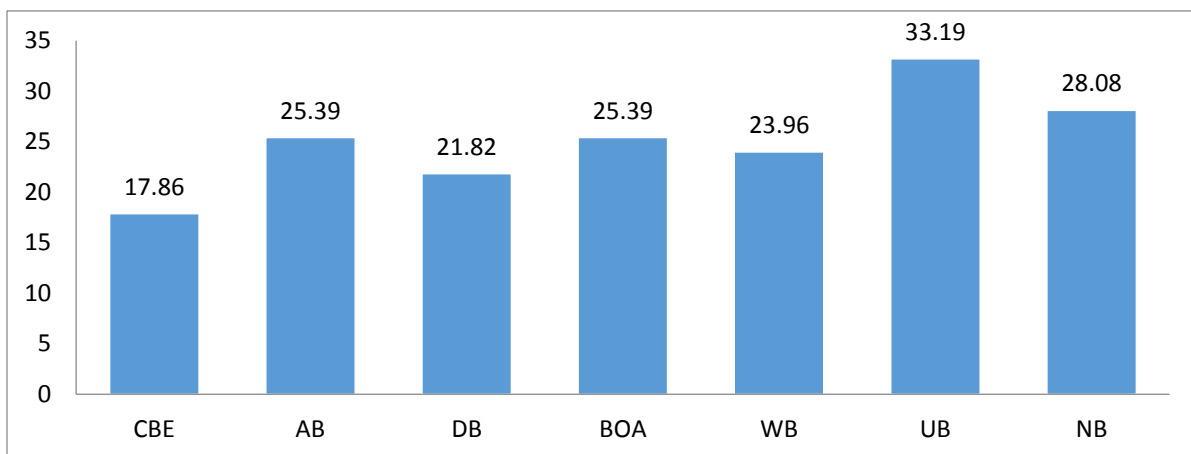
Regarding individual banks, average growth rate of loan are UB (33.19%) and NB (28.08%) while the lowest was CBE (17.86%). Generally, from the trend of LG, one can understand that, as the main income of commercial banks depends from an interest of loan and advance the loan growth of the studied banks implied that, all of the studied banks are profitable. This implies that commercial Banks of Ethiopia have been utilized the liquid assets effectively and efficiently.

The Effect of ROA on NPLs

Profitability is the likelihood of a business earning the desired level of income within a specific period of time under certain prevailing business conditions. ROA measured by the ratio of net profit before tax to total asset.Net profit before tax was used in order to avoid the impact of different period's tax rate on the net profit of the bank. The Figure indicated both average growth rate of the studied banks and each banks position. Below the table indicated profitability trend of the studied commercial banks

Figure 9 Trend of profitability of the industry

Averege ROA from 2002 - 2016

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
ROA	0.88	1.44	2.23	2.8	3.17	3.24	2.95	2.98	3.27	3.56	3.69	3.17	3.12	2.54	2.58	2.775
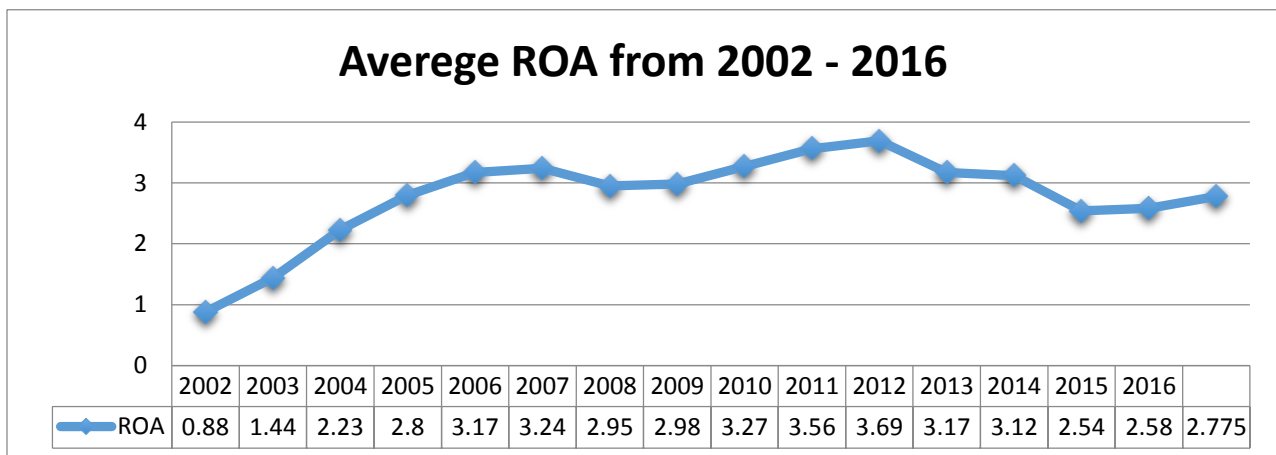
Source Each banks annual Report

As shown in above fig. the average growth rate of Return on Asset (ROA) of the studied banks constantly increased from the year 2010 to 2012, however, starting to 2015 and 2016 highly decreased. Accordingly, the minimum return on asset of 0.88% was registered in the year 2002 and the maximum return on asset of 3.69% was registered on the year 2012. On the other hand, the ROA of each bank also not similar, accordingly below the fig implied each of the studied commercial banks potential of ROA during the last 9 years.

Figure 10 Trend of each banks performance of Profitability

Each Banks Avg. growth rate ROA 2002 -2016

	CBE	AB	DB	BOA	WB	UB	NB
ROA	2.34	2.87	2.94	2.23	3.26	2.58	3.20
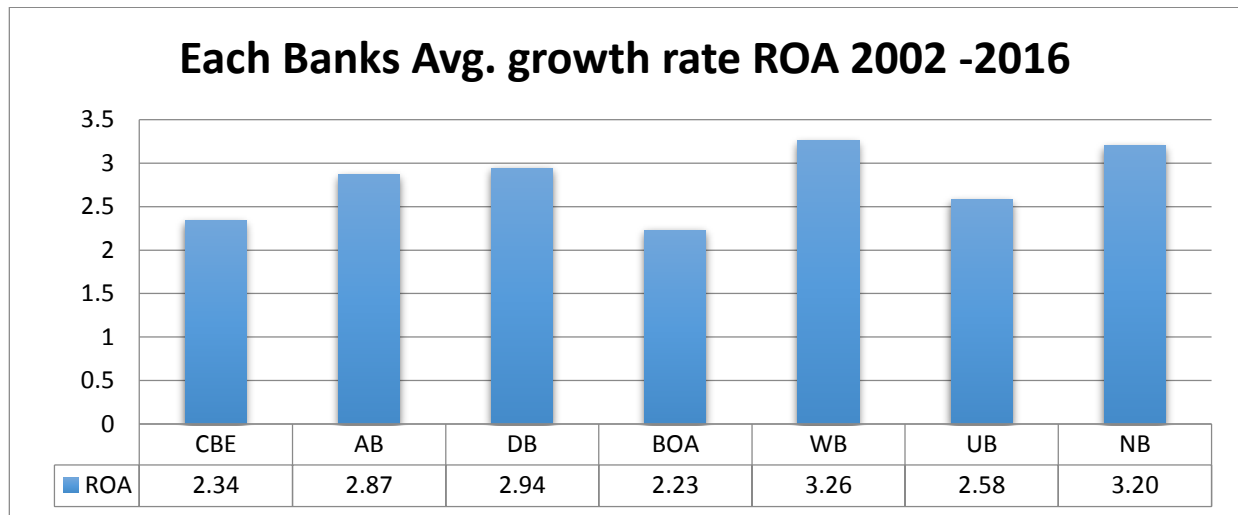
Source Each banks annual Report

Regarding the studied banks level the average growth rate of WB 3.26%, NB (3.20%), DB (2.94%) and AB (2.87%) were the highest while, UB (2.58%), CBE (2.34%), and BOA (2.23%) was the lowest of all banks considered in this study. Though the net profit of older banks was higher in magnitude than newly opened banks, equivalently the total asset of the older banks was higher and as a result, the ratio of ROA has not shown a significant difference between the studied banks. Generally, as the rate of profitability declining throughout the years it affects NPLs performance of commercial banks negatively.

Inflation rate of the country (INF)

It is a situation in which the economies overall price level is rising. It represents sustained and pervasive increment in aggregate price of goods and services resulting decline in purchasing power of money. Accordingly, when inflation is high and unexpected, it can be very costly to an economy. At the same time, inflation generally transfers resources from lender and savers to borrowers since borrowers can repay their loans with birr that are worthless. It is determined as the general consumer price index. This indicates that, as inflation increase, the cost of borrowing gets more expensive and deteriorates the quality of loan portfolio. Below the fig. implied the effect of inflation over the studied banks

Figure 11 Inflation Trend of the country and its effect on NPLs
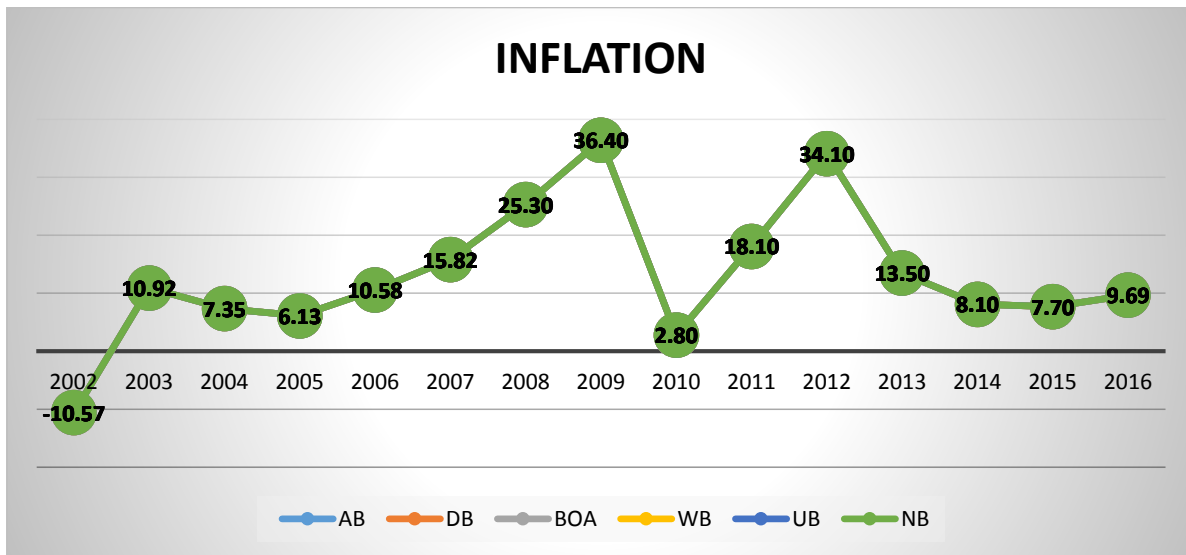
The maximum inflation rate was recorded in the year 2009 (36.40%) and in 2012 (i.e. 34.10%) followed by the year 2008 (25.300%) and the minimum inflation rate which was recorded in 2002 (-10.57%) and 2010 (2.8%). High inflation may pass through to nominal interest rates, reducing borrowers' capacity to repay their debt. Through its attraction with the tax system, it can increase tax burden by artificially increasing income and profits. Besides, inflation cause firms to increase their costs of changing prices. Finally, it made individuals hold less cash and make more trips to banks since inflation lowers the real value of money holdings.

Gross Domestic Product (GDP)

Gross Domestic Product (GDP) is an indicator of the economic health of a country as well as the gauge of a country's standard of living. It is the measurement of the level of economic activity of a country. For the purpose of this study, GDP is measured by the annual real growth rate of the gross domestic product. Below the figure indicates the country GDP for the following 15 consecutive years and its effect on NPLs of Commercial Banks

37

Figure 12 Trend of GDP and Its effect on NPLs

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
GDP	1.63	-2.10	11.73	12.64	11.54	11.79	11.19	10.04	10.57	11.40	8.70	9.90	10.35	10.40	8.00
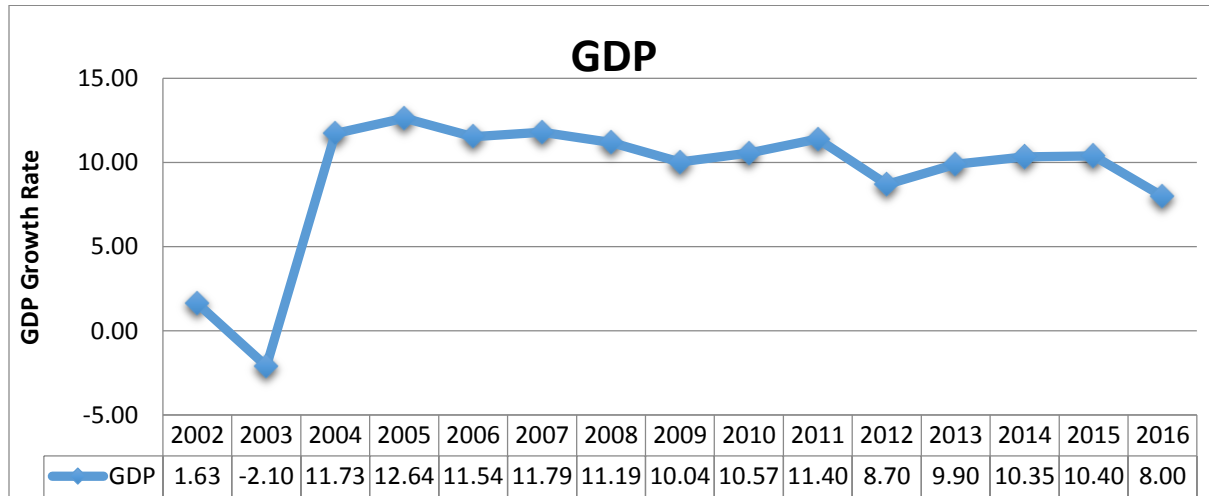
Source NBE Report

As indicated on the above figure the minimum GDP growth rate was scored in 2003(-2.10%), 2002 (1.63%), 2016 (8%), 2012(8.70%) and 2013 (9.90%) otherwise the country GDP was Growth in Double-digit. According to the study results the GDP of the country specifically, in the year 2016 decline this is because of the political instability of the country. Scholar analyzed the relation between GDP and NPLs in several ways accordingly, GDP growth and employment are negatively associated with the NPL. Conversely, unemployment is positively related to the NPL. Several empirical studies have found a negative association between NPL and real GDP low growth rate (Salas and Saurina 2002; Fofack, 2005; Jimenez and Saurina, 2006; Khemraj and Pasha, 2009; Dash and Kabra, 2010). The justification provided in the empirical literature of this association is that higher positive level of real GDP growth habitually entails a higher level of income. This improves the capacity of the borrower to pay its debts and contributes to reducing bad debts. When there is a downturn in the economy (slowed or negative growth of GDP) the level of bad debts will increase.

Lending Rate

Lending Rate/interest rate: Lending rates are one of the primary economic determinants of non-performing loans. As far as interest rate policy is concerned it plays a very important role in NPLs growth rate in a country/economy, Hoque and Hossain (2008) examined this issue and according to them, non-performing loans are highly correlated with the lending rate. Below the fig. Implied lending rate of the studied banks

Figure 13 Average lending rate trend and its effect on NPLs of the studied banks

Lending Rate

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Lending Rate	10.75	10.75	10.75	10.5	10.5	10.5	11.50	12.25	12.25	11.88	11.88	11.88	11.88	11.88	12.75

Y-axis: Lending arte of the country (0 to 14)
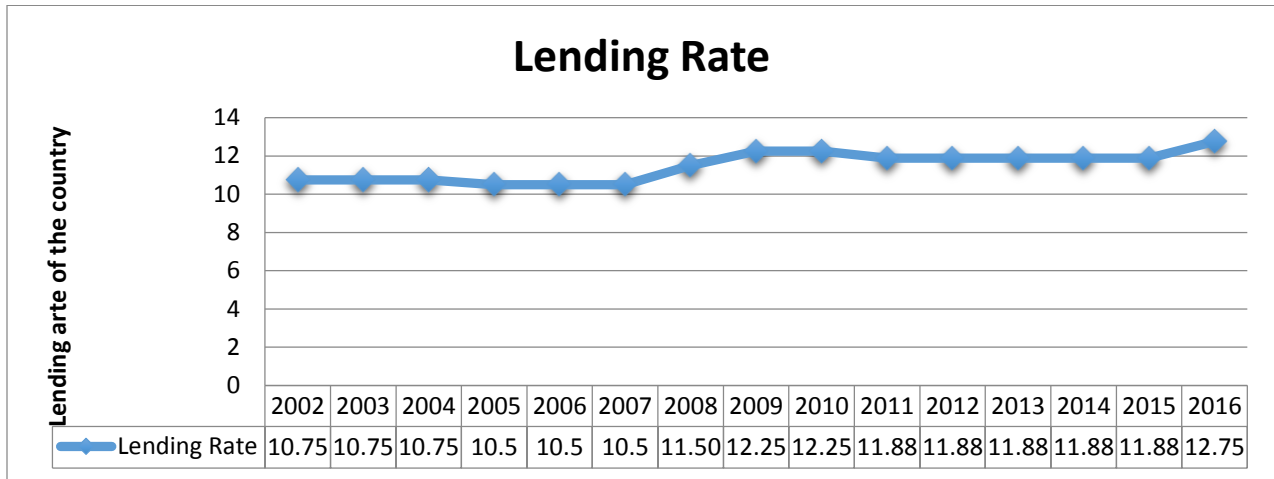
Source Each banks annual Report

The last independent macro variable is the lending rate. The mean value of lending rate was 10.50% observed in 2005 to 2007 and the highest was 12, 75% in 2016. The lending rate of the country over the past 15 years was the stable that implies the bank's profit increased and has a positive impact on the country's economic growth.

Exchange Rate

No one can predict what the exchange rate will be in the next period, it can move in either upward or downward direction regardless of what the estimates and predictions were. An appreciation of exchange rate can have mixed effects. It may weaken the competitiveness of export-oriented firms and adversely affect their ability to pay their debts (Fofack, 2005). However; it may improve the debt servicing capacity of borrowers whose loans are in foreign currencies. So, the relationship between EXR and NPL may be mixed. An increase in the ER is expected to decrease nonperforming loan ratio. The results of the study trend analysis also implied this, accordingly the fig. below portray the increment trend of foreign exchanges.

Figure 14 Trend of exchange rate and its effect on NPL

Exchange Rate

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Exchange Rate	8.57	8.60	8.63	8.66	8.69	9.03	9.61	11.30	13.53	16.91	17.73	18.64	19.58	20.57	21.80
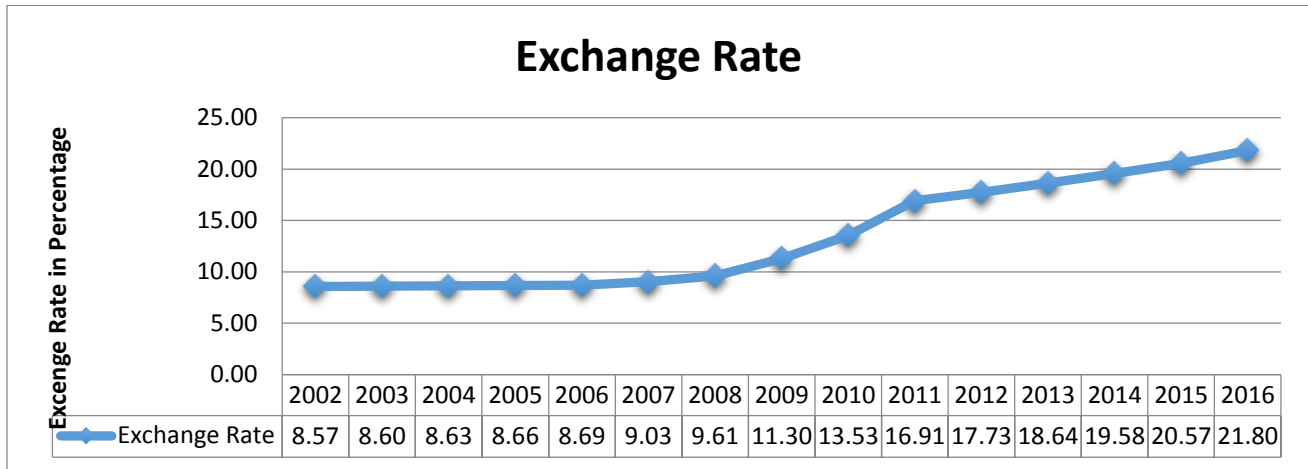
Source Each banks annual Report

As implied by the above the exchange rate of the banks consistently increases from the year 2011 to 2016. Accordingly, the minimum exchange rate observed in 2002 (8.57%) while the maxim was 2016 (21.80%). This implies that the foreign exchange rate in Ethiopia during the study period remains high. Since the country's currency highly devaluated and during the period the bank's client especially importers are highly disputed and failed to repay the required bank loan repayments.

4.1.2 Correlation Analysis

In this section, the correlation between the dependent variables and the independent variables have been presented and analyzed. According to Brooks (2008), the correlation between two variables measures the degree of linear association between them. To find the relationship between variables I had used the most broadly applied correlation statistics of Pearson correlation which was once used in this study. Values of Pearson's correlation coefficient are always between -1 and +1. A correlation coefficient of +1 indicates that two variables are perfectly related in a positive sense; a correlation coefficient of -1 indicates that two variables are perfectly related in a negative sense, and a correlation coefficient of 0 indicates that there is no linear relationship between the two variables. A low correlation coefficient; 0.1 - 0.29 suggests that the relationship between two items is weak or non-existent. If r is between 0.3 and 0.49 the relationship is moderate. A high correlation coefficient i.e. >0.5 indicates a strong relationship between variables. The direction of the dependent variable's change depends on the sign of the coefficient. If the coefficient is a positive number, then the dependent variable will move in the same direction as the independent variable;

if the coefficient is negative, then the dependent variable will move in the opposite direction of the independent variable. Hence in this study both the direction and the level of relationship between the dependent and independent variables conducted using the Pearson's correlation coefficient. The table below presents the result of the correlation analysis.

Table 3 Correlation Analysis

	NPL	BS	EXR	GDP	INFR	LG	LIQ	LR	ROA
NPL	1								
BS	0.11576	1							
EXR	-0.63541	0.65756	1						
GDP	-0.06288	0.31946	0.15322	1					
INFR	-0.00378	0.25559	0.10690	0.25612	1				
LG	-0.18999	-0.31178	-0.15003	-0.0807	-0.0309	1			
LIQ	-0.53948	-0.38816	-0.57222	-0.0464	0.12463	-0.1846	1		
LR	-0.47760	-0.60465	-0.59953	0.13159	0.32387	-0.3174	-0.2441	1	
ROA	-0.19542	0.1642	0.26194	-0.53346	0.41081	0.17567	-0.0256	0.26235	1

Source: Author Own computation (2018)

As implied in the above correlation matrix between independent variables, there were fairly low data correlations among the independent variables. These low correlation coefficients indicate that there is no problem of multicollinearity in the study. Moreover, Kennedy (2008) stated that multicollinearity problem exists when the correlation coefficient among the variables is greater than 0.70, but in this study, there is no correlation coefficient that exceeds or even close to 0.70 except some variables such as EXR and BS. Accordingly, in this study there is no problem of multicollinearity which enhanced the reliability for regression analysis.

4.1.3 Regression Model Assumption and Diagnostic Test

After different tests were run to make the data prepared for analysis and to get reliable output from the research classical linear regression model is better to satisfy basic assumption. As noted by Brooks (2008), once these assumptions are satisfied, it is considered as all available information is employed within the model. However, if these assumptions are violated, there will be a data that left out of the model and also the researcher choose fixed effects model. Accordingly, before applying the model for testing the significance of the slopes and analyzing the regressed result, heteroscedasticity, autocorrelation, multicollinearity and normality tests are made for identifying

misspecification of information if any thus on fulfill analysis quality. After the diagnostic test finalized

4.1.3.1 Results of Regression Analysis and Diagnostics test

Different tests were run to form the data ready for analysis and to get reliable output from the study. These tests were expecting to check whether the OLS assumptions, are fulfilled when the explanatory variables are regressed against the dependent variables.

Heteroscedasticity Test

In the classical linear regression model, one of the assumptions is Homoscedasticity. When the scatter of the errors is different, varying depending on the value of one or more of the independent variables, the error terms are heteroskedastic (Gujarati & Porter, 2009).

Heteroscedasticity white test is used to test the heteroscedasticity problem in this research. This test is very important because if the model consists of heteroscedasticity problem, the OLS estimator no longer BEST and error variances are incorrect, therefore the hypothesis testing, standard error and confident level will be invalid. If the p-value is less than significant level we reject the null hypotheses otherwise, do not reject the null.

Table 4 Heteroscedasticity Test

Heteroscedasticity Test: White			
F-statistic	3.17472	Prob. F(44,60)	0.15399
Obs*R-squared	73.4508	Prob. Chi-Square(44)	0.26011
Scaled explained SS	77.2539	Prob. Chi-Square(44)	0.48432

The p-value of this model is 0.48432 which is more than the significant level 0.05 (5%), so the model doesn't have heteroscedasticity problem.

Autocorrelation Test

The most commonly used test is "Durbin-Watson test for autocorrelation" is based on the assumption that the errors in the regression model are generated by a first-order autoregressive process observed at equally spaced time periods. The Durbin-Watson statistic ranges in value from 0 to 4. A value near 2 indicates non-autocorrelation; a value toward 0 indicates positive autocorrelation; a value toward 4 indicates negative autocorrelation. The result of this study was 1.662771, so the value indicates non-autocorrelation.

Multicollinearity

According to the Gujarati (2009), multicollinearity will occurs if some or all of the independent variables are highly correlated with one another. It will causes the regression model has difficulty telling which independent variables are affecting the dependent variable. If an independent variable is an exact linear combination of the other independent variables, then we say the model suffers from perfect collinearity, and it cannot be estimated by OLS Brooks (2008).

If multicollinearity problem too serious in model, this study have to take action to add in other important independent variable or drop unimportant independent variables.

Table 5 Multicollinearity Test

	BS	EXR	GDP	INFR	LG	LIQ	LR	ROA
BS	1							
EXR	0.657557	1						
GDP	0.319456	0.153219	1					
INFR	0.255589	0.106898	0.256125	1				
LG	-0.31178	-0.15003	-0.08069	-0.03087	1			
LIQ	-0.38816	-0.57222	-0.04642	0.124634	-0.1846	1		
LR	-0.60465	-0.599533	0.131594	0.323874	-0.31745	-0.24406	1	
ROA	0.164197	0.261941	0.533455	-0.410815	0.175671	-0.02557	0.26235	1

The result of correlation matrix indicates that there were low data correlations among the independent variables. Kennedy (2008) stated that multicollinearity problem exists when the correlation coefficient among the variables are greater than 0.70, but in this study there is no correlation coefficient that exceeds or even near to 0.70.

Normality

Normality test is used to determine whether the error term is normally distributed or not. Jarque Bera test is to ensure that the data set is well-modeled by a normal distribution. The hypothesis for the Normality Test is stated as follow:

H0: The error term is normally distributed

H1: The error term is not normally distributed

If P-value of JB is less than significant level of 5% we reject the H0. Otherwise, do not reject H0.

Table 6 Normality Test

	Probability (P-Value)
Jarque Bera Test	1.397736

Source: Developed by researcher

P-Value = 1.3977 means do not reject H0 the error term is normally distributed.

Result of Regression Analysis

The section covers the empirical regression model used in this study and the results of the regression analysis. Empirical model: As presented in the methodological part of the study, the empirical model used in the study in order to identify the factors that can affect Ethiopian commercial banks NPLs provided as follows:

$$Y_i = (\beta_0 + \beta_1 BS_{it} + \beta_2 EXR_{it} + \beta_3 GDP_{it} + \beta_4 INFR_{it} + \beta_5 LG_{it} + \beta_6 LIQ_{it} + \beta_7 LR_{it} + \beta_8 ROA_{it}) + \varepsilon_i$$

According to Chris brooks (2008), the *p*-value of Hausman test is less than 1% fixed effect model is appropriate. Due to this, the researcher use fixed effect model. The Fixed Effect model assumes that the marginal effects of the explanatory variables on the dependent unit are the same for all units. Constant term is allowed to vary among the banks to account for the differences between units. These constant terms capture all unobserved characteristics that differentiate the units from each other.

44

Table 1 Regression analysis result between variables

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.014029	0.013328	-1.052598	0.2952
BS	0.002377	0.00037	6.430936	0.0000
EXR	-0.000826	0.000187	-4.422019	0.0000
GDP	0.025293	0.012902	1.96039	0.0528
INFR	-0.001427	0.004268	-0.334385	0.0388
LG	-0.006013	0.002593	-2.3189	0.0225
LIQ	0.000538	0.000152	3.527652	0.0006
LR	-0.275964	0.109567	-2.51867	0.0134
ROA	0.051112	0.053626	0.95311	0.0342

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.793398	Mean dependent var	0.012294
Adjusted R-squared	0.769534	S.D. dependent var	0.006628
S.E. of regression	0.004002	Akaike info criterion	-3.122067
Sum squared resid	0.001538	Schwarz criterion	-2.894585
Log likelihood	135.4085	Hannan-Quinn criter.	-3.029887
F-statistic	21.6504	Durbin-Watson stat	1.662771
Prob(F-statistic)	0.00000		

R-squared

The R-squared (R^2) statistic measures the success of the regression in predicting the values of the dependent variable within the sample. In standard settings, R^2 may be interpreted as the fraction of the variance of the dependent variable explained by the independent variables. The statistic will equal one if the regression fits perfectly, and zero if it fits no better than the simple mean of the dependent variable. It can be negative for a number of reasons. For example, if the regression does

not have an interceptor constant, if the regression contains coefficient restrictions, or if the estimation method is two-stage least squares.

In this study the R-squared statistics of the model was 0.793398. This indicates that the changes in the independent variables collectively explain 79.3398% of the changes in the dependent variable and the remaining 20.6602% of changes is explained by other factors which are not included in the model. Thus these variables collectively, are good explanatory variables. One of the problem using R^2 is every time when add an independent variable to the model the R^2 never decreases.

Adjusted R-Squared

Adjusted R^2 is a corrected goodness-of-fit (model accuracy) measure for linear models. It identifies the percentage of variance in the target field that is explained by the inputs.

Adjusted R^2 is always less than or equal to R^2. A value of 1 indicates a model that perfectly predicts values in the target field. A value that is less than or equal to 0 indicates a model that has no predictive value. In the real world, adjusted R^2 lies between these values. In our model the adjusted R^2 result is   0.769534 it is less than the R^2 result and the value indicates the model was perfectly predicts values in the target field

Probability (F-statistic)

The probability of (F-statistic) test is 0.000 indicates strong statistical significance, which enhanced the reliability and validity of the model means all selected explanatory variables can affect the level of NPLs in common.

Following the result obtained from the regression analysis as depicted in the above table, the next section tries to present the analysis concurrently with respect to each NPLs determent factors.

Bank Size

With regards to Size of the bank and its relation with NPLs, Size of the banks has a positive relationship with NPLs at 1% significance level with a P-value of 0.0000.

This finding suggests that diversification and effective monitoring measures increase bank size to cover unexpected events and reduce the chances of insolvency (see also Baradwaj et al. 2014; Marijana Ćurak et al. 2013).

Exchange Rate

Negative and significant relationship between the EXR rate and NPLs. Ethiopia had high level of foreign currency loans, and it is expected that the NPLs ratio reacts strongly to exchange rate volatility. This result suggests that a depreciation of the domestic currency would lead to an increase in the NPLs rate, to the decline of credit worthiness of private debtors and the fact that export-oriented companies do not use the positive effects of depreciation of the national currency on export, due to low competitiveness of their products. This result is in contrast with the analysis conducted by Beck et al. (2015);

Gross Domestic Products

GDP coefficient implied positively relate with NPLs at a significance level of 10% with a p-value (0.0528); which implies when GDP goes up by 1 NPLs also goes up by 0.025293. Economic growth usually improves income which ultimately enhances the loan payment capacity of the borrower which in turn contributes to lower bad loan and vice versa.

GDP growth positively affects loan demand and supply of deposits hence the positive impact on bank profitability. The positive relationship is supported by Pervan et al., (2015), Sufian and Habibullah, (2009) and Kosmidou, (2008).The results did not confirm the findings by Tan and Floros, 2012) that with economic growth, business environment is improved and barriers to entry are lowered leading to high competition which reduces profitability.

Inflation

The indirect and significant relation between NPLs and inflation suggests that recessionary period deteriorate underwriting standards and reduces the ability of borrowers to repay loans because of the higher prices of goods. The Table shows that the coefficient of inflation is negative and significant at 5% significant level.

Loan Growth

The study result with related to explanatory variables of Loan Growth (LA) has a negative relationship with NPLs at 1% significance level with a P-value 0.0225. The result implied that when loan growth is goes up by one unit non- performing loan is goes down by 0.006013.

Liquidity

The explanatory variable liquidity (LIQ), have a positive relationship with NPLs and at 1% statically significance level with (P-value = 0.0006). The result is consistent with theory Richard (2011), liquidity ratio has a negative influence on bank NPLs such as inefficient utilization of resources and loan services by the banks is decline and also not disburse additional loans to the prominent clients to strength the borrower's capacity.

Lending Rate

The study variable Lending rate (LR) had a negative associate with NPLs at 5% significance level with a p-value 0.0134.Hence, When lending rate is going up by one unit non-performing loan is goes down by 0.275964 provided other independent variables are constant.

Return on Asset

There is a positive and significant relationship between ROA and NPLs. This result points out that When ROA of the ratio increases NPLs also increase and they are positively correlated at 5% significance level with a P-value of 0.0342.This implies when profitability goes up by one unit NPLs also improved by 0.005112.

CHAPTER FIVE

Summary, Conclusion and Recommendation of the study

5. Introduction

This study aims to identify factors affecting NPLs in some selected commercial banks of Ethiopia. In doing so, previous studies on bank NPLs have been reviewed and NPLs determent factors are identified. Therefore, this study specified an empirical framework to investigate the determinants of Ethiopian commercial banks NPLs from 2002 to 2016. The NPLs determinant factors that were used in this study include variables such as, bank size, exchange rate, GDP, inflation, loan growth, liquidity, lending rate and return on asset based on this, the major findings of the study summarized, concluded and recommended as follows:

5.1 Summary

The main objectives of the study were to determine factors affecting non-performing loans in Ethiopian commercial banks during the year 2002 – 2016. Non-performing loans used as a dependent variable and bank size, loan growth, liquidity, lending rate, ROA, GDP, exchange rate and inflation rate were used as independent variables. The study used both descriptive and inferential statistics technique.

The descriptive statistics result showed that the NPLs of Ethiopian commercial banks and the independent variables of BS, LG, LIQ, LR, ROA, GDP, EXR AND INFR trend analysis major findings of the study summarized as follow:

Regarding NPLs the trend implied that performance of the studied banks was improved from year to years as implied by the average non-performing rate, it was improved from 0.063% and 0.082 in 2002 and 2003, to 0.016% and 0.017% in 2015 and 2016 respectively. This implied performance of commercial banks increases in collecting the loan from borrowers. However, the trend of NPLs performance of each bank was not the same some of the banks perform well while the others not well.

The average total assets of Ethiopian commercial banks have shown consistent growth throughout the studied period. Accordingly, the maximum total asset was registered in 2016 (4.46%) while the minimum was registered in 2002 which is 3.09%. Hence, the larger bank size induces economy

of scale thereby making larger banks more profitable and will reduce the cost of gathering and processing information.

The average liquidity position of the industry was to grow from the year 2002 – 2011, however, starting 2012 – 2016 it implied constant declining; it may relate in addition to increasing loan facilities for several sectors the application of 27% NBE bill Purchase regulatory. Generally, average minimum liquidity position of the industry observed in 2016 (20.11%) while the maximum was 47.49% in 2009.

Regarding loan growth, the trend shows fluctuate the rate throughout the studied years in year 2009 decline to 4.45% and which is the minimum average growth rate of the loan, while the maximum loan growth rate was observed in 2003 (38.93%) and 2012 (37.32%).

In relation to ROA, the average growth rate implied consistent increment from the year 2002 to 2012, however, starting in 2013 – 2016 slightly decreased. Accordingly, the minimum return on asset of 0.88% was registered in the year 2002 and the maximum return on asset of 3.69% was registered on the year 2012.

In relation to INF, the maximum inflation rate was recorded in the year 2009 (36.400%) and in 2012 (34.10%) and the minimum inflation rate which was recorded in 2002 (-10.57%). Therefore; a positive and significant relationship between INFR and NPLs. This discovering points to the conclusion that the effect of higher interest rates due to inflation and declining economic conditions which are commonly associated with rising inflation, succeed over the tremendous impact that inflation would possibly have on borrowers debt servicing capacity

Regarding GDP, the study found that the minimum GDP growth rate was scored in 2003 (-2.10%), 2002(1.63%), 2012 (8.70%), 2013 (9.90%) and 2016 (8.80%) otherwise the country GDP was Growth in Double- digit. According to the study results the GDP of the country specifically, in the year 2016 decline this is because of the political instability of the country. GDP growth has a positive and significant influence on bank performance. This suggests an improvement in the widespread profits in the economic system is profit-enhancing. GDP growth positively affect the loan demand and supply of deposits hence the positive impact on bank profitability. The positive relationship is supported by Pervan et al., (2015), Sufian and Habibullah, (2009) and Kosmidou, (2008).

The minimum value of lending rate was 10.5% observed in 2005 to 2007 and the highest were 12, 75% in 2016. The lending rate of the country over the past 15 years was stable lending rate that implies the banks profit increased and has a positive impact for the country's economic growth.

In relation to exchange rate of the banks consistently increases from the year 2002 to 2016. Accordingly the minimum exchange rate observed in 2002 (8.57%) while the maxim was 2016 (21.80%). This implies that the foreign exchange rate in Ethiopia during the study period remains high.

5.2 Conclusion

The main objective of the study was to identify the main banks internal factors and macro-economic factors that can affect NPLs of Ethiopian banks

Regarding the trend analysis of the eight commercial banks of Ethiopia had downward sloping of NPLs for the period 2002-2016.

The descriptive statistics indicate the levels of NPLs of commercial banks in Ethiopia are above the threshold i.e. more than 5%, this means when NPLs increase above the threshold, they start to cause negative effect on lending.

The regression analysis result showed that the determinant variables BS, GDP, LIQ and ROA are positive and significant relationship with NPLs, and also EXR, INFR, LG and LR are a negative and significant relationship with NPLs.

5.3 Recommendation

The study implied that an increase in nonperforming loans increases credit risk. Based on the conclusion this study recommends that management of each bank improve their inspection techniques and loan application methodologies in screening potential borrowers because the existing credit risk trend may bring a series collapse against the sector as well as the national economy in general.

It is necessary to oversight of the risk in individual loans. The Prudent risk in selections is vital to maintaining favorable loan quality. To manage loans properly, bankers must understand not only the risk posed by each credit but also how the risks of individual loans and portfolios are interrelated.

Understanding the credit culture and the risk profile of the banks is central to successful loan management. Because of the significance of a bank's lending activities, the influence of the credit culture frequently extends to other banks activities. Staff members throughout the bank should understand the bank's credit culture and risk profile. The knowledge should pass from chief credit policy officer to account officers to administrative support. Directors and senior management officers should not only publicly endorse the credit standards that are a credit culture's backbone, but should also employ them when formulating strategic plans overseeing portfolio management.

To ensure effective monitoring, it is recommended that management should ensure that credit offices of the branch should be adequately resourced in terms of staff, vehicles and other logistics, to support monitoring activities and follow up the borrowed fund are being used the intended purpose and timely monitor the loan is being disbursed. It enables the lender assesses borrowers' current financial conditions, ensure the adequacy of collaterals, ensure that loans are in compliance with the terms and conditions of the facility, and identify potential problem loans for action to be taken.

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APPENDIXES

Appendixes

Appendix I: Regression Result
  Dependent Variable: NPL
  Method: Panel Least Squares
  Date: 03/22/18 Time: 11:52
  Sample: 2002 2016
  Periods included: 15
  Cross-sections included: 7
  Total panel (balanced) observations: 105

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.014029	0.013328	-1.052598	0.2952
BS	0.002377	0.00037	6.430936	0.0000
EXR	-0.000826	0.000187	-4.422019	0.0000
GDP	0.025293	0.012902	1.960394	0.0528
INFR	-0.001427	0.004268	-0.334385	0.0388
LG	-0.006013	0.002593	-2.3189	0.0225
LIQ	0.000538	0.000152	3.527652	0.0006
LR	-0.275964	0.109567	-2.51867	0.0134
ROA	0.051112	0.053626	0.95311	0.0343

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.793398	Mean dependent var	0.012294
Adjusted R-squared	0.769534	S.D. dependent var	0.006628
S.E. of regression	0.004002	Akaike info criterion	-3.122067
Sum squared resid	0.001538	Schwarz criterion	-2.894585

Log likelihood	135.4085	Hannan-Quinn criter.	-3.029887
F-statistic	21.6504	Durbin-Watson stat	1.662771
Prob(F-statistic)	0.00000		

Appendix II: Heteroscedasticity White Test

F-statistic	3.174724	Prob. F(44,60)	0.15399
Obs*R-squared	73.45076	Prob. Chi-Square(44)	0.26011
Scaled explained SS	77.25394	Prob. Chi-Square(44)	0.48432

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/22/18   Time: 12:27
Sample: 1 105
Included observations: 105

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.005289	0.014668	-0.360609	0.7197
BS^2	5.99E-06	2.390000E-06	2.50938	0.0148
BS*EXR	8.82E-08	1.72E-06	0.051338	0.9592
BS*GDP	7.13E-05	8.82E-05	0.808317	0.4221
BS*INFR	1.16E-05	4.76E-05	0.243975	0.8081
BS*LG	6.58E-06	1.44E-05	0.458171	0.6485
BS*LIQ	1.11E-07	1.09E-06	0.101542	0.9195
BS*LR	-0.001765	0.000819	-2.154921	0.0352
BS*ROA	-0.00047	0.000405	-1.160758	0.2503
BS	-6.63E-05	0.000111	-0.594375	0.5545
EXR^2	5.64E-07	1.74E-06	0.323484	0.7475
EXR*GDP	2.03E-05	0.000809	0.025099	0.9801
EXR*INFR	-1.10E-05	4.52E-05	-0.244238	0.8079
EXR*LG	1.11E-05	9.56E-06	1.164683	0.2488
EXR*LIQ	9.30E-07	4.34E-07	2.143833	0.0361
EXR*LR	-0.000573	0.001701	-0.336763	0.7375
EXR*ROA	0.000456	0.00018	2.531627	0.014
EXR	-5.12E-06	0.000187	-0.027393	0.9782
GDP^2	0.004295	0.005326	0.806371	0.4232
GDP*INFR	1.98E-05	0.002689	0.007354	0.9942
GDP*LG	-9.99E-05	0.000669	-0.149237	0.8819
GDP*LIQ	-9.88E-05	4.87E-05	-2.029251	0.0469
GDP*LR	-0.051175	0.62439	-0.08196	0.935

GDP*ROA	0.004055	0.012588	0.322153	0.7485
GDP	0.007257	0.060823	0.119315	0.9054
INFR^2	0.000176	0.000929	0.189247	0.8505
INFR*LG	0.000342	0.000281	1.216749	0.2285
INFR*LIQ	-4.62E-06	1.53E-05	-0.301969	0.7637
INFR*LR	-0.00601	0.017543	-0.342587	0.7331
INFR*ROA	0.007608	0.004069	1.869515	0.0664
INFR	0.00036	0.002371	0.151731	0.8799
LG^2	-0.000129	8.31E-05	-1.554189	0.1254
LG*LIQ	-7.71E-06	6.98E-06	-1.103684	0.2741
LG*LR	-0.016985	0.007204	-2.357891	0.0217
LG*ROA	0.002807	0.003417	0.821429	0.4147
LG	0.001868	0.000774	2.414748	0.0188
LIQ^2	-2.47E-07	2.68E-07	-0.920322	0.3611
LIQ*LR	-0.000601	0.000349	-1.724879	0.0897
LIQ*ROA	0.000279	0.000166	1.687688	0.0967
LIQ	7.44E-05	3.99E-05	1.86411	0.0672
LR^2	0.085737	0.827588	0.103599	0.9178
LR*ROA	-0.175838	0.106287	-1.654377	0.1033
LR	0.066623	0.228823	0.291155	0.7719
ROA^2	-0.070496	0.038499	-1.831104	0.0721
ROA	0.014759	0.014919	0.989279	0.3265

R-squared	0.699531	Mean dependent var	1.46E-05
Adjusted R-squared	0.479187	S.D. dependent var	2.33E-05
S.E. of regression	1.68E-05	Akaike info criterion	-18.8473
Sum squared resid	1.70E-08	Schwarz criterion	-17.7099
Log likelihood	1034.482	Hannan-Quinn criter.	-18.3864
F-statistic	3.174724	Durbin-Watson stat	1.79331
Prob(F-statistic)	0.000019		

Appendix III: Normality Test

Series: Residuals
Sample 1 105
Observations 105

Mean	-1.48e-16
Median	0.029858
Maximum	1.045535
Minimum	-1.095375
Std. Dev.	0.382696
Skewness	-0.193710
Kurtosis	3.411567
Jarque-Bera	1.397736
Probability	0.497148
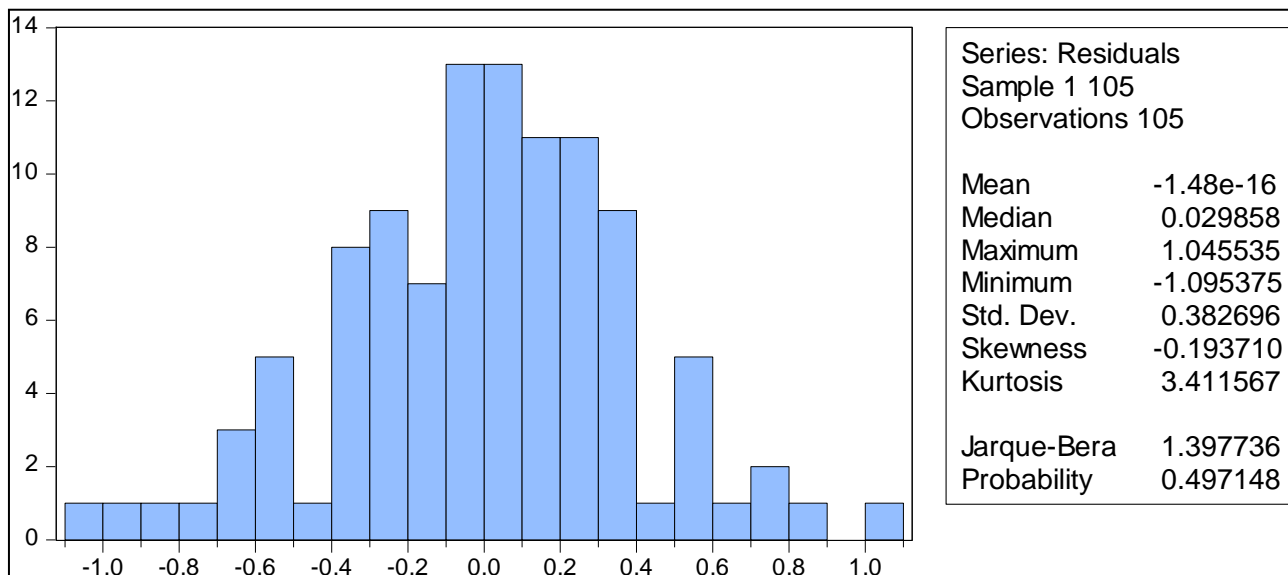
Appendix IV: Raw Data

Appendix IV: Choosing Random Vs Fixed Effect Model

Dependent Variable: NPL
Method: Panel Least Squares
Date: 08/31/11   Time: 00:51
Sample: 2002 2016
Periods included: 15
Cross-sections included: 7
Total panel (balanced) observations: 105

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BS	0.319513	0.118914	2.686916	0.0086
EXR	-0.0662	0.020954	-3.15935	0.0022
INFR	0.005517	0.00342	1.613041	0.1102
GDP	0.002942	0.011563	0.25445	0.7997
LG	-0.00346	0.002218	-1.5608	0.1221
LIQ	1.812623	0.287478	6.305263	0
LR	-0.35785	0.089203	-4.01163	0.0001
ROA	-0.19748	0.04782	-4.12971	0.0001
C	3.112543	0.94238	3.302854	0.0014

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.815936	Mean dependent var	1.229421
Adjusted R-squared	0.787304	S.D. dependent var	0.662785
S.E. of regression	0.30567	Akaike info criterion	0.598942
Sum squared resid	8.409067	Schwarz criterion	0.978079
Log likelihood	-16.4444	Hannan-Quinn criter.	0.752575
F-statistic	28.49715	Durbin-Watson stat	1.262905
Prob(F-statistic)	0.00000		

Year	Banks	NPLs	Bank Size	Liquidity	Loan Growth	Return on Asset	Inflation Rate	GDP	Lending Rate	Exchange Rate
2002	CBE	0.03203	23.03	37.56	-0.08510	-0.02159	-0.10572	0.01634	0.10750	8.56600
2003	CBE	0.03367	23.12	42.35	-0.12286	0.02352	0.10924	-0.02099	0.10750	8.60000
2004	CBE	0.03195	23.26	43.01	-0.02666	0.01280	0.07347	0.11729	0.10750	8.63000
2005	CBE	0.03054	23.43	42.32	0.14787	0.01871	0.06126	0.12644	0.10500	8.66000
2006	CBE	0.02874	23.50	43.17	-0.02721	0.02324	0.10577	0.11539	0.10500	8.69000
2007	CBE	0.02653	23.68	43.57	0.04981	0.02179	0.15823	0.11795	0.10500	9.03000
2008	CBE	0.01808	23.82	38.59	0.77667	0.02900	0.25300	0.11187	0.11500	9.61000
2009	CBE	0.01131	23.97	35.81	0.20576	0.03498	0.36400	0.10041	0.12250	11.30090
2010	CBE	0.00588	24.17	33.52	0.14880	0.02947	0.02800	0.10567	0.12250	13.53210
2011	CBE	0.00916	24.55	35.75	0.49816	0.03038	0.18100	0.11400	0.11880	16.90810
2012	CBE	0.00788	24.83	30.69	0.73186	0.03980	0.34100	0.08700	0.11875	17.73050
2013	CBE	0.00956	25.01	31.48	0.14812	0.03432	0.13500	0.09900	0.11880	18.64260
2014	CBE	0.01030	25.17	27.86	0.21968	0.03056	0.08100	0.10348	0.11880	19.57710
2015	CBE	0.00875	25.63	32.39	-0.30310	0.01591	0.07700	0.10400	0.11880	20.56590
2016	CBE	0.00993	26.07	32.73	0.31646	0.02880	0.09689	0.08000	0.12750	21.80040
2002	AB	0.01335	19.48	38.40	0.20000	0.02317	0.05356	0.03400	0.10750	8.56600
2003	AB	0.01705	19.80	38.65	0.25589	0.01114	0.10924	-0.02099	0.10750	8.60000
2004	AB	0.02041	20.12	39.29	0.18250	0.01640	0.07347	0.11729	0.10750	8.63000
2005	AB	0.01825	20.42	37.99	0.36364	0.01902	0.06126	0.12644	0.10500	8.66000
2006	AB	0.01589	20.78	35.89	0.45116	0.03012	0.10577	0.11539	0.10500	8.69000
2007	AB	0.01459	21.10	35.90	0.34188	0.04216	0.15823	0.11795	0.10500	9.03000
2008	AB	0.01526	21.38	38.64	0.08992	0.03302	0.25300	0.11187	0.11500	9.61000
2009	AB	0.01705	21.71	41.62	-0.00909	0.02543	0.36400	0.10041	0.12250	11.30090
2010	AB	0.01548	21.95	41.93	0.15949	0.03446	0.02800	0.10567	0.12250	13.53210
2011	AB	0.01281	22.22	39.57	0.26728	0.03994	0.18100	0.11400	0.11880	16.90810
2012	AB	0.00993	22.39	35.36	0.38083	0.03577	0.34100	0.08700	0.11875	17.73050

2013	AB	0.00833	22.62	33.49	0.40064	0.03788	0.13500	0.09900	0.11880	18.64260
2014	AB	0.00833	22.93	35.16	0.19019	0.03543	0.08100	0.10348	0.11880	19.57710
2015	AB	0.00531	23.11	30.43	0.36024	0.02940	0.07700	0.10400	0.11880	20.56590
2016	AB	0.00405	23.32	32.34	0.23784	0.02782	0.09689	0.08000	0.12750	21.80040
2002	BOA	0.01740	19.52	37.55	0.22129	0.01856	-0.10572	0.01634	0.10750	8.56600
2003	BOA	0.02041	19.73	36.90	0.45298	0.01553	0.10924	-0.02099	0.10750	8.60000
2004	BOA	0.02028	19.97	36.90	0.33386	0.02399	0.07347	0.11729	0.10750	8.63000
2005	BOA	0.01589	20.32	35.85	0.32071	0.02329	0.06126	0.12644	0.10500	8.66000
2006	BOA	0.01131	20.73	34.38	0.41756	0.03339	0.10577	0.11539	0.10500	8.69000
2007	BOA	0.01548	20.96	35.37	0.26043	0.03533	0.15823	0.11795	0.10500	9.03000
2008	BOA	0.02186	21.23	38.59	0.09880	0.03447	0.25300	0.11187	0.11500	9.61000
2009	BOA	0.02282	21.53	40.83	0.01586	0.02846	0.36400	0.10041	0.12250	11.30090
2010	BOA	0.02001	21.68	39.47	0.13419	0.02934	0.02800	0.10567	0.12250	13.53210
2011	BOA	0.01194	21.85	39.62	0.23148	0.03337	0.18100	0.11400	0.11880	16.90810
2012	BOA	0.00956	21.99	37.15	0.30660	0.04052	0.34100	0.08700	0.11875	17.73050
2013	BOA	0.00693	22.22	36.44	0.09091	0.03256	0.13500	0.09900	0.11880	18.64260
2014	BOA	0.00588	22.33	36.11	0.06401	0.03416	0.08100	0.10348	0.11880	19.57710
2015	BOA	0.00405	22.54	33.29	0.22242	0.03121	0.07700	0.10400	0.11880	20.56590
2016	BOA	0.00336	22.75	34.07	0.10134	0.02726	0.09689	0.08000	0.12750	21.80040
2002	DB	0.01131	19.88	38.68	0.13547	-0.00196	-0.10572	0.01634	0.10750	8.56600
2003	DB	0.01361	20.28	38.53	0.25589	0.00485	0.10924	-0.02099	0.10750	8.60000
2004	DB	0.01308	20.66	38.97	0.18250	0.02605	0.07347	0.11729	0.10750	8.63000
2005	DB	0.01163	20.96	38.43	0.36364	0.03350	0.06126	0.12644	0.10500	8.66000
2006	DB	0.00993	21.31	35.80	0.45116	0.03476	0.10577	0.11539	0.10500	8.69000
2007	DB	0.00916	21.64	36.26	0.34188	0.02151	0.15823	0.11795	0.10500	9.03000
2008	DB	0.00833	21.93	37.25	0.08992	0.00380	0.25300	0.11187	0.11500	9.61000
2009	DB	0.00833	22.17	40.94	-0.00909	0.02062	0.36400	0.10041	0.12250	11.30090
2010	DB	0.00788	22.43	40.54	0.15949	0.02392	0.02800	0.10567	0.12250	13.53210

2011	DB	0.00693	22.61	38.64	0.26728	0.02669	0.18100	0.11400	0.11880	16.90810
2012	DB	0.00742	22.79	36.18	0.38083	0.02788	0.34100	0.08700	0.11875	17.73050
2013	DB	0.00788	22.92	31.44	0.40064	0.02355	0.13500	0.09900	0.11880	18.64260
2014	DB	0.00642	23.02	34.08	0.19019	0.04180	0.08100	0.10348	0.11880	19.57710
2015	DB	0.00531	23.14	40.33	0.36024	0.02339	0.07700	0.10400	0.11880	20.56590
2016	DB	0.00531	23.28	31.25	0.23784	0.02365	0.09689	0.08000	0.12750	21.80040
2002	NB	0.00182	18.37	37.90	0.18023	0.00976	-0.10572	0.01634	0.10750	8.56600
2003	NB	0.01386	19.15	37.98	0.40640	0.01433	0.10924	-0.02099	0.10750	8.60000
2004	NB	0.01335	19.64	38.44	0.29247	0.03154	0.07347	0.11729	0.10750	8.63000
2005	NB	0.01411	20.09	38.74	0.35772	0.03483	0.06126	0.12644	0.10500	8.66000
2006	NB	0.01361	20.30	36.16	0.58982	0.03665	0.10577	0.11539	0.10500	8.69000
2007	NB	0.01224	20.63	38.81	0.35279	0.03903	0.15823	0.11795	0.10500	9.03000
2008	NB	0.01335	21.04	41.08	0.08899	0.03651	0.25300	0.11187	0.11500	9.61000
2009	NB	0.01526	21.37	43.59	-0.09988	0.03908	0.36400	0.10041	0.12250	11.30090
2010	NB	0.01361	21.63	43.49	0.17113	0.04113	0.02800	0.10567	0.12250	13.53210
2011	NB	0.01411	21.83	42.41	0.17631	0.04684	0.18100	0.11400	0.11880	16.90810
2012	NB	0.00993	22.00	38.81	0.22530	0.04099	0.34100	0.08700	0.11875	17.73050
2013	NB	0.00916	22.11	36.04	0.31536	0.03664	0.13500	0.09900	0.11880	18.64260
2014	NB	0.00742	22.28	30.61	-0.01828	0.02818	0.08100	0.10348	0.11880	19.57710
2015	NB	0.00405	22.50	32.10	0.31872	0.02825	0.07700	0.10400	0.11880	20.56590
2016	NB	0.00588	22.69	33.31	0.23622	0.02512	0.09689	0.08000	0.12750	21.80040
2002	UB	0.00182	17.49	43.19	0.21642	0.01515	-0.10572	0.01634	0.10750	8.56600
2003	UB	0.00875	18.17	40.99	0.77914	0.01277	0.10924	-0.02099	0.10750	8.60000
2004	UB	0.01361	18.74	39.98	0.32414	0.01225	0.07347	0.11729	0.10750	8.63000
2005	UB	0.01361	19.43	40.25	0.54427	0.03549	0.06126	0.12644	0.10500	8.66000
2006	UB	0.01065	19.98	38.84	0.69309	0.03293	0.10577	0.11539	0.10500	8.69000
2007	UB	0.01099	20.40	38.96	0.40438	0.03385	0.15823	0.11795	0.10500	9.03000
2008	UB	0.00993	20.90	40.38	0.31891	0.03352	0.25300	0.11187	0.11500	9.61000

2009	UB	0.01131	21.34	42.30	0.15733	0.02369	0.36400	0.10041	0.12250	11.30090
2010	UB	0.01281	21.61	42.39	0.21437	0.03308	0.02800	0.10567	0.12250	13.53210
2011	UB	0.01030	21.92	40.72	0.25381	0.03404	0.18100	0.11400	0.11880	16.90810
2012	UB	0.00833	22.06	37.46	0.24670	0.03608	0.34100	0.08700	0.11875	17.73050
2013	UB	0.00642	22.20	32.42	0.15308	0.02278	0.13500	0.09900	0.11880	18.64260
2014	UB	0.00336	22.39	36.38	0.07618	0.01814	0.08100	0.10348	0.11880	19.57710
2015	UB	0.00182	22.59	31.39	0.35317	0.02144	0.07700	0.10400	0.11880	20.56590
2016	UB	0.00262	22.78	31.08	0.24406	0.02144	0.09689	0.08000	0.12750	21.80040
2002	WB	0.01589	18.67	38.80	0.54286	0.02989	-0.10572	0.01634	0.10750	8.56600
2003	WB	0.01629	19.15	37.26	0.69753	0.01832	0.10924	-0.02099	0.10750	8.60000
2004	WB	0.01758	19.51	36.83	0.42909	0.03283	0.07347	0.11729	0.10750	8.63000
2005	WB	0.01629	20.00	36.36	0.44148	0.03088	0.06126	0.12644	0.10500	8.66000
2006	WB	0.01569	20.44	34.00	0.30185	0.03086	0.10577	0.11539	0.10500	8.69000
2007	WB	0.01482	20.99	36.12	0.23186	0.03280	0.15823	0.11795	0.10500	9.03000
2008	WB	0.01775	21.19	39.88	0.16335	0.03613	0.25300	0.11187	0.11500	9.61000
2009	WB	0.01808	21.45	42.60	0.05037	0.03634	0.36400	0.10041	0.12250	11.30090
2010	WB	0.01386	21.58	43.09	0.14676	0.03728	0.02800	0.10567	0.12250	13.53210
2011	WB	0.01504	21.97	42.58	0.08656	0.03768	0.18100	0.11400	0.11880	16.90810
2012	WB	0.00875	22.01	39.33	0.34064	0.03720	0.34100	0.08700	0.11875	17.73050
2013	WB	0.00788	22.25	35.23	0.22489	0.03437	0.13500	0.09900	0.11880	18.64260
2014	WB	0.00531	22.33	31.86	0.19035	0.02990	0.08100	0.10348	0.11880	19.57710
2015	WB	0.00470	22.54	29.12	0.27485	0.02809	0.07700	0.10400	0.11880	20.56590
2016	WB	0.00470	22.71	31.77	0.08963	0.02680	0.09689	0.08000	0.12750	21.80040