



ST.MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES

**DETERMINANTS OF ASSET QUALITY: IN ETHIOPIAN
PRIVATE COMMERCIAL BANKS**

BY

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JANUARY, 2018
SMU
ADDIS ABABA



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**A THESIS SUBMITTED TO ST.MARY'S UNIVERSITY SCHOOL OF
GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS
ADMINISTRATION (ACCOUNTING AND FINANCE CONCENTRATION)**

**JANUARY, 2018
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DECLARATION

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of Master of Business Administration in Accounting and Finance. All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree.

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ACKNOWLEDGEMENT

First and for most, I would like to thank Almighty for his graciously provision of knowledge, protection, patience, wisdom, inspiration and diligence required for the successful completion of this thesis.

Secondly, I would like to express my deep gratitude to my advisor, Abebaw Kassie (PhD), for his fruitful support, encouragement, invaluable comments and guidance at various stages of the study.

Thirdly, I would like to express my deepest and heartfelt acknowledgment to my wife and my staff members,

Fourthly, I would like to thank all those helped me in accessing secondary data that used to conduct this study including management and workers of NBE. Especially, I would like also to express my gratitude for NBE staff members, who helped me in accessing some of macroeconomic data that I used to conduct this study.

Finally, I would like to thank St.Mary's university and Mr. Desalgn Berie (vice president for business and administration) for giving me free scholarship support, and encouragement during my studies period.

LIST OF ABBREVIATIONS AND ACRONYMS

ALR	Average Lending Rate
CAR	Capital Adequacy Ratio
CLRM.	Classical Linear Regression Model
ER	Efficiency Ratio
dL	Lower bound
dU	Upper bound
DW	Durbin Watson
GDP	Gross Domestic Product
INF	Inflation
LLP	Loan Loss Provision
LTD	Loan to Deposit
NPL	Non-Performing Loan
OLS	Ordinary Least Squares
ROA	Return on Asset
ROE	Return on Equity

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Abstract

According to Sharon (2007), loans have a vital contribution towards development of economy. However, its non-payment also leads to incidence of huge loss on banks in particular and country in general. Hence, this study was conducted to examine both bank specific like (loan to deposit ratio, capital adequacy ratio, return on asset, return on equity and efficiency ratio) and macroeconomic like (gross domestic product, lending rate, inflation rate), determinants of asset quality, the case of Ethiopian private commercial banks. To this end, the researcher has selected six senior commercial banks in Ethiopia by using purposive sampling method. This study used secondary sources of data, which is panel data in nature, over the period 2000-2016. These data were collected from NBE and CSA. Furthermore, fixed effect model was used to examine the determinants of asset quality. This research is an explanatory research design that identifies the cause and effect relationships between the asset quality and its determinants. The finding revealed as LTD ratio, efficiency ratio, gross domestic product, inflation had positive relationship and statistically significant impact on the level of asset quality whereas average lending rate capital adequacy and return on equity are negative relationship and statistically significant impact on the level of asset quality but return on asset is negative and insignificant effect on the level of asset quality of private commercial banks operated in Ethiopia. The finding of this study is significant since once identifying the determinants of asset quality might enable management body to make appropriate lending policies that prevent the occurrence of pure asset quality. Furthermore, the study recommended as bank managers should emphasize by increasing the negative significant effects of explanatory variable and decrease positive significant effects of variable to manage asset quality of Ethiopian private commercial banks.

Key words: asset quality, loan losses provision, Nonperforming loans, bank specific factors, macroeconomic factors

CHAPTER ONE

Introduction

This chapter focuses on the background of the study that gives some insight on the issues of asset quality of private commercial banks in Ethiopia. After giving some insight on the issues of Asset quality, statement of the problem part that can show the direction of the study, Justifies the main reasons to carry out this study. Following this, both general and specific Objectives of the study, significance of the study, scope and limitation of the study, and Ethical consideration, finally organization of the paper are respectively.

1.1. Background of the Study

The most important functions of banks are the mobilization of fund from depositors to investors. Since the lending function is measured by the banks earn their highest gross profits from loans; the administration of loan portfolios critically affects the profitability of banks. Indeed, large number of non-performing loans is the major cause of bank failure. Banks are learning to assess their risk portfolios using the criteria laid down by Basel II. A study on (Rehm, 2002) Basel's goal is to promote bankers on improving their risk management capability, how the institutions price products, reserve for loan losses, and control their entire operations.

Financial health is the most important factor when we think about Bank's role, and it requires decisions about what to do with bad loans and reserve for loan losses. The strength of bank's portfolio depends on the healthiness of its borrowers. In many countries failed business enterprises bring down the banking system. A good financial system requires minimum level of NPLs and LLPs, which in turn facilitates the economic development of any country. Nonperforming loans have been a hindrance to economic stability and growth of the economies (Beck, 2001).

A study by Elona, (2016) provisioning rules and capital management are linked through the coverage of credit risk, where expected loan losses have to be covered by loan loss

provisions (LLP), while unexpected loan losses covered by bank capital. Therefore, it is very important for banks to properly manage LLP to ensure that sufficient amounts are allocated to counterbalance non-performing loans (NPL) mainly throughout financial turmoil. So the major function of loan losses provision is to cover expected losses but LLP is an important tool to pursue other objectives that drive managerial discretionary behavior such as signaling, income smoothing, and capital management. These factors, together with economic fluctuation and, non-discretionary components determine the provisioning policy of banks.

According to Rawlin et al. (2012), the main aim of any business is to make profits. That is why properly manage of any asset should generate income for the business. Since this issue is more applicable for the banking sector of business, banks should give due consideration on the management of loans because lending is the main business of commercial banks and loan is normally the main assets and vital source of revenue for any commercial banks. (Daniel and Wandera, 2013). Therefore, banks do grant loans and advances to business organizations, individuals as well as government in order to enable them operates on investment and development activities as a mean of contributing toward the economic development of a country in general and aiding their growth in particular.

According to Greenidge and Grosvenor (2010), the extent of loan losses Provision is a key element in the initiation and progression of financial and banking crises. (Guy,2011). He argues that non- performing loans have been mostly used as a measure of asset quality among low cost efficiency (high cost inefficiency) signals of the current poor performance of the senior managers in managing day to day activities and loan portfolio.

The study of Skarica, (2013) on the determinants of NPLs in Central and Eastern European countries through fixed effect model was also found as unemployment rate, GDP growth rate, and inflation had negative and significant effect on NPLs. Similarly, (Carlos, 2012) by using OLS model estimators found as NPLs have negative association with GDP growth rate whereas a positive association with the number of unemployment rate. Besides, (Moti et al. 2012), made study on the effectiveness of credit management

system on loan performance and found as credit quality, credit risk control, interest rates charged, and collection policies had an effect on loan performance in Kenya.

According to Daniel, (2010), the most important functions of Ethiopia commercial banks in the area of financial intermediations are deposit mobilization and lending activities. Among the three major financial institutions operating in Ethiopia (Banks, Insurance and microfinance institutions) the dominant one is the banking sector which takes the lion's share in respect of loans and advance. The Government will assume so many macroeconomic issues like inflation, in addition to the negative impact of the regulation in the performance of all commercial banks, and assume it is reasonable Cost the banks are paying because of the regulation. The government believes that the profitability and sustainability of privately owned commercial banks are mainly arise from the safe business floor created by the regulation and take in to consideration that most of commercial banks failures are caused by NPLs.

Similar to African and other Western countries, in Ethiopia also (Wondimagegnehu, 2012), conducted a study on determinants of nonperforming loans and found as poor credit assessment, underdeveloped credit culture, failed loan monitoring, lenient credit terms and conditions, weak institutional capacity compromised integrity, aggressive lending, , unfair competition among banks, and fund diversion for un expected purposes and overdue financing had an effect on the occurrence of NPLs.

Thus, given the unique features of banking sector and environment in which they operate and also rapid expansion of banking institutions in Ethiopia, there are strong desires to conduct a separate study on the determinants of Asset quality of banking sector in Ethiopian Private Commercial banks. Besides, inconsistent results in different studies among researchers are also another motive to conduct this study. To this end, the aim of this study was to examine the determinants of asset quality of Ethiopian private commercial banks. It employed a regression analysis and a data set covering Sixteen years (2000 to 2016). The study aims to fill the existing research gap by analyzing the relationship between bank specific and macroeconomic variables and determinants of asset quality of Ethiopian private commercial banks. Three macro-economic determinants like (inflation rate, gross domestic product, and average lending rate) and

five bank specific (return on asset, return on equity, efficiency ratio, loan to deposit ratio and capital adequacy) factors are used in this research.

1.2. Overview of Banking System in Ethiopia

Bank of Abyssinia was the first bank established in Ethiopia based on the agreement between Ethiopian government and National bank of Egypt in 1905 with a capital of 1 million shillings. However, bank of Abyssinia was closed at in 1932 by Ethiopian government under Emperor Haile Selassie and replaced by Bank of Ethiopia with a capital of pound sterling 750,000. Following the Italian occupation between 1936-1941, the operation of bank of Ethiopia ceased whereas the departure of Italian and restoration of Emperor Haile Selassie's government established the state bank of Ethiopia in 1943. However, State bank of Ethiopia was separated into National bank of Ethiopia and commercial bank of Ethiopia S.C. to separate the responsibility of national bank from commercial banks in 1963. Then, on December 16, 1963 as per proclamation No.207/1955 of October 1963 commercial bank of Ethiopia control all commercial banking activities (Fasil and Merhatbeb, 2009).

Following the declaration of socialism in 1974, the government extends the extent of its control over the whole economy and nationalized all large corporations. Accordingly, Addis bank and commercial bank of Ethiopia share company were merged by proclamation No.84 Of August 2, 1980 to form single commercial bank in the country until the establishment of private commercial banks in 1994. To this end, financial sector were left with three major banks namely; National bank of Ethiopia, commercial bank of Ethiopia and Agricultural and development bank during the socialist government. However, following the departure of Dergue regime, Monetary and Banking proclamation of 1994 established the National bank of Ethiopia as a legal entity. Next this, Monetary and Banking proclamation No.84/1994 laid down the legal basis for investment in banking sectors (Habtamu, 2012).

Currently, banking sectors in Ethiopia are showing progressive developments in terms of number of branches, total assets, human resource utilization and the like relative to other African developing countries. This indicates as Ethiopia categorized under banked country with limited outreach (Tseganesh, 2012).

Commercial bank is a depository institution that is relatively unrestricted in its ability to make commercial loan and that is largely permitted to issue checking accounts. Commercial banks are the most important of all depository institution (Leroy and Vanhoos, 2006). They creates money by through lending and purchasing securities (Thomas, 2006). Commercial banks extend credit to different types of borrowers for many different purposes.

One of the major functions of any commercial bank is providing loan to the business society. Banks collect money from those who have excess money and lend it to others who need money for business as well as personal conceptions. Therefore, banks' intermediary function plays a vital role in the economic activity. Banks collect deposits from customers and use those funds to give loans to other potential customers or invest in other assets that will yield a return higher than the amount bank pays the depositor (McCarthy et al., 2010), It follows that customers' deposit is the primary source of bank loan and hence, increasing or guaranteeing deposits directly has a positive effect on lending. Therefore, bank credit is the primary source of available debt financing for most customers whereas good loans are the most profitable assets for banks.

The principal profit making activity of commercial banks is providing loans to its customers. In the allocation of funds to earn the loan portfolio, the primary objective of bank management is to earn income while serving the credit needs of its community (Zewdu, 2010).Therefore, like all debt instruments, a loan entails the redistribution of financial assets over time, between the lender and the borrower. The borrower initially receives an amount of money from the lender to pays back period, but sometimes not always in regular installments, to the lender. This service is generally provided at a cost, known as interest on the debt. As one of the principal duties of financial institutions is to provide loans, it is typically the main source of income to banks. Besides, bank loans and credit also constitute one of the ways of increasing money supply in the economy (Felix and Claudine, 2008).

Loans are the largest single source of income for banks. Bank loan involves personal relationships between the bankers and borrowers. It has a highest degree of default risk than other bank assets. Loans yield the higher rate of return among bank assets in compensation for lower liquidity and higher risk (Thomas, 2006). A loan composition

greatly varies among banks based on their size, location, trade area and lending experts (MacDonald, 2006).

According to Zewdu (2010), lending is the provision of resources (granting loan) by one party to another. The second party doesn't reimburse the first party immediately there by generating a debt, and instead arranges either to repay or return those resources at a later date. Banks function as financial intermediaries, collecting funds from savers in the form of deposit and then supplying to borrowers as loans. Those functions benefit both the banks and the borrowers. Lending service is the heart bit of the banking industry as a and Loans are the dominant asset and represent 50- 75 percent to total amount at most banks, generate the largest amount of shares operating income and represents the bank's greatest risk exposure (MacDonald, 2006).

Classifications of Loans and Advances

Loan can be classified as performing and non-performing. Performing loan is loan that Payments of both principal and interest charges are up to date as agreed between the creditor and debtor. Generally, loans those 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 NPLs. To identify the loans which are non- performing and to calculate and determine the amount of provisions according to loans directive number SBB/43/2007 loans are classified into five class.

1. Pass: Loans or advances that are fully protected by the current financial and the paying capacity of borrower and are not subject to criticism. In other word passed means loans paid back.

2. Special Mention: Past due for more than 30 days but less than 90 days. Special mention class of loans implies Loans to incorporations, which may get some trouble in the repayment due to business cycle losses.

3. Substandard: Past due for more than 90 days but less than 180 days. Substandard signify Loans whose interest or principal payments are longer than three months in arrears of lending conditions are eased.

4. Doubtful: Past due for more than 180 days but less than 360 days. Doubtful indicate that full liquidation of outstanding debts appears doubtful and the accounts suggest that there will be a losses.

5. Loss: Past due over 360 days, in other word loss imply that outstanding debts are regarded as not collectable. Non-performing loans comprise the loans in the last three categories (Substandard, Doubtful and Loss), and are further differentiated according to the degree of collection difficulties. as per the directive No. SBB/43/2007 Minimum provision percentage against outstanding principal amount of each loan or advance classified in accordance with the criteria for the classification of loan or advance on the above. Next, this table show that the minimum percent of provision for loan losses.

Classification category	Minimum provision
Pass	1 %
Special mention	3%
Substandard	20%
Doubtful	50%
Loss	100%

Source: Directive No. SBB/43/2007

1.3. Statement of the Problem

Asset quality affect the bank`s liquidity and profitability which are the main components for the overall bank efficiency, an increase in LLPs diminishes the bank profit or income. Again, mismatch of maturities between asset and liability create liquidity risk for the banks that decline bank`s overall credit rating including its image (Badar and Yasmin, 2013).Therefore, the determinants of Asset quality must have been given more attention because of its adverse effect on survival of banks.

Commercial bank is an entity that acts as the middle person between the lender and borrower. One of the major functions of commercial banks is collect deposit and granting loans and advances, loan is one of the main services provided by the bank but it is also the most risky service because of the credit risk, which is directly related to non-performing loans and loan losses provision. a loan that borrower might not be paid as they promised non-performing loan create an adverse impact on the bank`s balance sheet and income statement, overall financial institutions profitability and economic growth of a country, the main determinants of Asset quality have, therefore, gained increasing attentions since the immediate consequence of large amount of nonperforming loans in the banking system is a cause of bank failure. It is accepted that the quantity or percentage of non-performing loan (NPLs) is often associated with bank failures and financial crises in both developing and developed countries (Caprio and Klingebiel, 2002).

The bank`s profitability is affected by non-performing loans, which are the major components for the overall efficiency of the bank. An increase in non-performing loan it reduce income. mismatch of maturities between asset and liability create liquidity risk for the banks that weaken bank`s overall credit rating including its image (Yasmin and Badar, 2013), a directive of National Bank of Ethiopia has issued which strictly requires all banks to maintain ratio of their non -performing loan not exceed five percent (NBE, 2008).

The study of Saba *et al.* (2012) the issue of “Determinants of Nonperforming Loan on US Banking sector” revealed that negative and significant effect of lending rate and positive significant effect of gross domestic products per capital and inflation rate on NPL via OLS regression model. Similarly, the study of (Louzis *et al.* 2010) examined

the determinants of nonperforming loan in the Greek financial sector using dynamic panel data model and found as ROA and ROE, GDP growth rate, had negative significant effect on asset quality whereas, unemployment, lending and inflation rates had positive significant on asset quality while capital adequacy ratio and loan to deposit ratio had insignificant effect on nonperforming loans. but, (Swamy,2012) revealed that determinants of nonperforming loans in the Indian banking sector using panel data and found as inflation, real GDP, capital adequacy and bank lending rate have insignificant effect on NPLs.

According to Makri *et al.*(2014) identify the factors affecting NPLs of Eurozone's banking systems through difference Generalized Method of the Moments (GMM) estimation revealed that return on asset did not show any significant impact on non performing loan ratio. However, (Jouini, and Selma, 2013) conducted a study on Spain, Greece and Italy for the period of 2004-2008 via panel data model and found a significant negative effect of ROA on NPLs.

According to Tesfaye, (2016), non-performing loans (NPLs) has been high for long period and has started declining at a higher rate in the recent years. In the years 2001 to 2003, the ratio of NPLs has reached more than 50 percent and then started to decline to the extent of reaching less than 10 percent. However, the industry averages of NPLs of commercial banks over the sample period of 2005 to 2013 are still above the 5% of the Basel and NBE standard limit. This can be seen from DB, WB, NIB, CBO and Zemen bank data. The ratio of non-performing loans for DB stood at 7.4% on 2009, WB stood at 7.7% on 2009, NIB stood at 9.1% & 7.3% on 2009 & 2010 respectively, CBO stood at 9.5% & 11.5% on 2009 & 2010 respectively and Zemen Bank S.C stood at 8.8% on 2013 are relatively very high compared with the threshold set by Basel and NBE, industry average standard limit.

Accordingly, banking industry in Ethiopian has its own unique features that distinguish them from other countries financial market. One of the features is the rule and regulation of the country is not allowed foreign nations or organization to fully or partially acquire share of Ethiopian banks. Also, there is no secondary market in the country. In the Ethiopian context, to the knowledge of the researcher, there has not been much research which is conducted on determinants of asset quality except, (Wondimagegnehu, 2012),

(Daniel, 2010), (Habtamu and Tilahun, 2015). All of the above studies are considers only bank specific factors, in the view of macroeconomic determinants only a study on (Zelalem, 2013), (Gadise, 2014), (Anisa, 2015) respectively.

Study by Zelalem, (2013) found that the results of GDP and inflation rate are negative and statistically significant effect on nonperforming loans. Whereas (Anisa, 2015) revealed that GDP and inflation rate are negative and statistically insignificant effect on NPLs. the same is true that a study by (Gadise, 2014) found that inflation rate has negative and statistically insignificant effect on the level of NPLs ,also a study on (Gadise,2014) revealed that loan to deposit rate are positive but statistically insignificant effect on NPLs. but the study by (Anisa, 2015) revealed that the result of loan to deposit rate were positive but statistically significant effect on NPLs in Ethiopian commercial banks. There is no empirical consensus among inside as well as out side countries studies, the results lack of consistency. The existence of inadequate research and inconsistent results of macroeconomic and bank specific determinants of asset quality in Ethiopian private commercial banks need further Study and analysis.

Therefore, the aim of this study is to carry out the above stated gap by analyzing both macroeconomic and bank specific determinants of Asset quality in Ethiopian private Commercial banks and providing useful information about the decision maker, also different stakeholders such as Banking sectors and researchers.

1.4. Objective of the Study

1.4.1 General objective

The General objective of this study is to examine the determinants of Asset quality of Ethiopian private commercial banks by using bank specific and macro-economic factors.

1.4.2 Specific objectives

Specific objectives of the study were;

1. To examine the effect of return on asset on private commercial banks of asset quality.
2. To examine the effect of return on equity on private commercial banks asset quality.
3. To examine the effect of capital adequacy ratio on private commercial banks asset quality.
4. To examine the effect of loan to deposit ratio on private commercial banks asset quality.
5. To examine the effect of efficiency ratio on private commercial banks asset quality.
6. To examine the effect of average lending rate on private commercial banks asset quality.
7. To examine the effect of gross domestic product on private commercial banks asset quality
8. To examine the effect of inflation on private commercial banks asset quality.

1.5. Significance of the study

Bank lending and borrowing activities are the main purpose of financial institutions and it is the heart of economic growth of any countries. The lending and borrowing activities get worse due to the loan defaults ultimately it will affect all financial activities of bank. Problem in any one of them makes operation inefficient and ineffectiveness. Specially, increase un-collectability of loan affect solvency and liquidity of the bank. By identifying the main causes of asset quality, the study will enable to:-

- ✓ This study will initiate the bank management to give due emphasis on the management of these identified variables and provides them with understanding of activities that will enhance their loan performance.
- ✓ All private commercial banks adopt workable strategies to control the problem of asset quality in the institution and thereby improve its financial performance and profitability. The management of each banks to come out with practical policies aimed at improving the quality of their loan portfolios.
- ✓ It will also help the country policymakers to implement effective monetary policies concerning credits and therefore prevent the occurrence of poor asset quality.
- ✓ The finding of this Study used as a directive input in developing regulatory standards regarding the lending Policies of Ethiopian private commercial banks.
- ✓ Furthermore, the results of this study to minimize the literature gap in the area of study particularly in Ethiopian commercial banks.

In addition, the study help as a source of reference for other related research works in the future.

1.6. Delimitation/Scope of the Study

This paper focus on the determinants of asset quality in private commercial banks in Ethiopia, the researcher decided to limit these study only to six Ethiopian private commercial banks. Namely, Awash international bank, Bank of Abyssinia, Wegagen bank, United bank, Nib International bank and Dashen bank that were registered by NBE before 2000/2001 G.C,. The reasons to choose those banks were selected since they are large size of asset classification that is greater than 9 billon,(NBE, 2015), besides, this study considers five bank specific and three macroeconomic factors. Such as return on asset, return on equity, loan to deposit rate, capital adequacy ratio, efficiency ratio, lending rate, GDP and inflation rate. the researcher chooses those variable because of the nature of the study and deferent researchers used those variable as dependent and independents on the same topic like (Saba *et al.*2012), (Louzis *et al*, 2010) (Anisa, 2015) and (Gadise, 2013). To this end, this study covers a panel data of these banks over the period 2000 to 2016 which have sixteen consecutive years.

1.7. Limitation of the study

The study is limited to five bank specific (ROA, ROE, ER, CAR, LTD) and three macroeconomic determinants (GDP, INF, ALR) the study is not covered all determinants of asset quality. Besides asset quality should be measured by NPL but the researcher used LLPs because of data confidentiality.

1.8. Organization of the paper

This paper is organized into five main chapters. The first chapter deals with presenting background of the study, statement of the problem, objective of the study, significance of the study, delimitation/scope of the study, the second chapter focuses on both theoretical reviews and empirical reviews of related literature inside and outside country studies and research hypothesis. The third chapter deals with research methodology, Chapter four deals with the data analysis and presentation and finally the fifth chapter contain the conclusion and recommendation of the study including the direction for further study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter begins with presenting the overview of banking system in Ethiopia. Besides, bank loans including its determinant factors were presented. Furthermore, concepts relating to Asset quality are discussed. Following this, empirical studies (cross countries, single country and our country studies) are reviewed by focusing on determinants of asset quality are presented, the research hypothesis those tested against the econometric results are presented, conceptual frame work and Then after, the knowledge gaps from the reviewed literatures are outlined.

2.2 Theoretical Literature

This part of literatures has three sections. The first section discusses Theories of Non-performing Loans and overview of banking system in Ethiopia. The second section presents bank lending by focusing on its definition, source and factors. Lastly, the issue of nonperforming loan is overviewed.

2.2.1. Theories of Non-performing Loans

2.2.1.1. Asymmetry Theory

Under the theory of asymmetric information tells us that it may be difficult to distinguish well from bad borrowers, (Auronen, 2003 and Richard,2011), which may result into adverse selection and moral hazards problems. The theory clarify that in the market, the party that flow more information on a specific item to be transacted is in a position to negotiate optimal term for the transaction than the other party, (Auronen, 2003). The party that knows less about the same specific item to be transacted is therefore in a position of making either right or wrong decision concerning the transaction. Adverse selection and moral hazards have led to significant accumulation of Nonperforming loan in banks (Berger and DeYoung, 1999).

2.2.1.2. Agency Theory

According to the agency theory, the principal agency problem can be reduced by better monitoring such as establishing more appropriate incentives for managers. In the field of corporate risk management agency issue have been shown to influence managerial attitudes towards risk taking and hedging. This Theory also explains a possible mismatch of interest between shareholder management and debt holders due to asymmetries in earning distribution, which can result in the firm taking too much risk or not engaging in positive net value project, (Smith and Stulz, 1987). Consequently, agency theory implies that defined hedging policies can have important influence on firm value, (Fite and Pflleiderer, 1995).

2.2.1.3. Transaction Cost Theory

Transaction cost theory is based on convexities in transaction technologies. Here, the financial intermediaries act as coalitions of individual lenders or scale or scope in the transaction technology. Transaction cost theory has proven an essential framework for decision on the vertical boundaries of the firm. Transaction costs are the cost associated to the division of work. (Williamson 2000), Transaction take place when a good or service is transferred. Variables that describe a transaction are among others, the specificity, the uncertainty, and the frequency of the transaction, whether an asset or a service is only or much more valuable in the context of a specific transaction.

2.2.1.4. Stakeholder theory

Stakeholders' theory, developed originally by Freeman in (1984), as a managerial instrument, has since evolved into a theory of the firm with high explanatory potential. Stakeholder theory focuses explicitly on equilibrium of stake holder's interests as the main determinant of corporate policy. The most hopeful contribution to risk management is the extension of implicit contracts theory form employment to other contracts, including sales and financing Cornell and Shapiro, (1987). To certain industries, particularly high-tech and services, consumer trust in the company being able to continue offering its services in the future can substantially contribute to company value. However, the value of these implicit claims is highly sensitive to expected costs of financial distress and bankruptcy. Since corporate risk management practices lead to a

decrease in these expected costs, 20 company value rises. Therefore stakeholder theory provides a new insight into possible rationale for risk management. However, it has not yet been tested directly.

2.2.2. Definition of Nonperforming Loans (NPLs)

There is no common definition of nonperforming loans (NPLs) in the whole country since it is recognized that it is possible that what is appropriate in one country may not be so in another. There is, however, some common opinion on this issue. Accordingly the IMF's Compilation Guide on Financial Soundness Indicators, NPLs is defined as:

“When payments of interest and/or principal are past due by 90 days or more, or interest payments equal to 90 days or more have been refinanced, capitalized, or delayed by agreement, or payments are less than 90 days overdue a loan is nonperforming, but there are other good reasons such as a debtor filing for liquidation to doubt that payments will be made in full” (IMF, 2005). Besides, the Ethiopian banking regulation also defines “Nonperforming loans are a loan whose credit quality has deteriorated and the full collection of principal and interest as per the contractual repayment terms of the loan and advances are in question” (NBE, 2008).

Generally, NPLs are loans that are outstanding both in its principal and interest for a long period of time contrary to the terms and conditions under the loan contract. Any loan facility that is not up to date in terms of payment of principal and interest contrary to the terms of the loan agreement is NPLs. Thus, the amount of nonperforming loan measures the quality of bank assets (Tseganesh, 2012).

2.2.2.1 Five Cs of Nonperforming/Bad loans

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

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

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

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

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

Competition: involves following the competitors' actions rather than monitoring the bank's own credit standards. Banks, however, still require expertise, experience, and customer focus to make them the preferred lender for many types of loans. Lending is not just a matter of making loans and waiting for repayment. Loans must be monitored and closely supervised to prevent loan losses (MacDonald, 2006).

2.3. Empirical Literature

This chapter provides so many evidences which identify the major determinants of bank loans, particularly, nonperforming loans. In case, some studies are conducted on particular country and the others on panel of countries. Hence many researchers have conducted a lot of study on determinants nonperforming loans (NPLs), due to its significance for the bank's failure. In case, the researcher starts reviewing empirical related literatures from the study made across country and then single country studies. There are a plenty of variables that affect the NPLs of banking sectors. In this study, the researcher focused on both bank specific and macroeconomic determinants of NPLs of selected private commercial bank in Ethiopia. Internal factors are caused by internal functions and activities of bank, and are due to decisions and practices of officials and staff's functions. These factors are controllable in which the manager can prevent them

through using suitable method, determination and elimination of weakness and improvement of process. Whereas, external factors can't be controlled by bank managers and are caused by external environment including effect on implementation of decisions and also government policies. For instance; unexpected events, changing in rules and obligations, political and economic changes (inflation and slump) are external factors (Biabani *et al*, 2012). However, a variety of variables that got more attention and included in this thesis are loan to deposit ratio, capital adequacy/solvency ratio, profitability (ROA & ROE), lending rate.

2.3.1. Across Countries Studies

According to Boudriga et al.(2009) conducted a study on the title “bank specific determinants and the role of the business and the institutional environment on Problem loans in the MENA countries” for 2002-2006 periods. They employed random-effects panel regression model for 46 countries. The variables included were credit growth rate, Capital adequacy ratio, real GDP growth rate, ROA, the loan loss reserve to total loan ratio, diversification, private monitoring and independence of supervision authority on nonperforming loans. The finding revealed that credit growth rate is negatively related to problem loans. Capital adequacy ratio is positively significant justifying that highly capitalized banks are not under regulatory pressures to reduce their credit risk and take more risks. Also ROA has negative and statistically significant effect on NPLs. This result supports as greater performance measured in terms of ROA reduces nonperforming loans since reduced risk taking in banks exhibiting high levels of performance.

A study on Djiogap and Ngoms, (2012), were revealed that the determinants of bank long-term loan in the Central African Economic and Monetary Community (CEMAC). They used the panel data of 35 commercial banks from six African countries over the period 2001-2010. They used fixed effect model to examine impact of bank size, GDP growth and capital adequacy ratio on NPLs. The study found negative significant impact of CAR on the level of NPLs. Their finding justifies as more diversified banks and well capitalized banks are better able to withstand potential credit. However, inflation variable is statistically insignificant in explaining the total business loans ratios of banks.

According to Klein (2013) revealed that the determinants and macroeconomic performance of nonperforming loans in Central, Eastern, and South Eastern Europe (CESEE) for 1998 to 2011 period data for ten banks of each 16 countries. The study includes loan growth rate, unemployment rate, inflation, and GDP as independent variables of the study. The study was used fixed effect/ dynamic model and found as, GDP growth rate have negative significant effect whereas inflation has positive loan growth rate on the occurrences of NPLs. However, the study found as number of unemployment rate has no significant effect on NPLs.

A study by Skarica (2013) also conducted a study on the determinants of NPLs in Central and Eastern European countries. In the study, Fixed Effect Model and seven Central and Eastern European countries for 2007-2012 periods was used. The study utilized loan growth, GDP, Unemployment, inflation rate and market interest rate, as determinants of nonperforming loans. The finding reveals as GDP growth rate and unemployment rate has statistically significant negative association with NPLs with justification of rising recession and falling during expansions and growth has an impact on the levels of NPLs. This shows as economic developments have a strong impact on the financial stability. The finding also reveals as inflation has positive impact with justification as inflation might affect borrowers' debt servicing capacities.

Selma and Jouini (2013) conducted a study on three countries namely Italy, Greece and Spain for the period of 2004-2008 to identify the determinants of non-performing loans for a sample of 85 banks. The variables included both macroeconomic variables (GDP growth rate, unemployment rate and real interest rate) and bank specific variables (return on assets, loan growth and the loan loss reserves to total loans). They apply Fixed Effect model and revealed a significant negative relationship of GDP growth rate & ROA, and also positive relationships of, the loan loss reserves to total loans unemployment rate and the interest rate with NPLs. A significant positive effect association between nonperforming loans and real interest rate, they justify that when an increase in interest rates can immediately leads to an increase in non-performing loans other things constant, especially for loans with floating rate since it decrease the ability of borrowers to meet their debt obligations. In addition, a significant negative relationship between ROA and the amount of NPLs justify that a bank with strong profitability has less incentive to

generate income and less forced to make use of in risky activities such as granting risky loans.

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

According to Zewdu (2010), the sources of fund for lending are reserve, deposits and capital. All these sources may be affected by different factors and would have a direct influence on lending. Lending rate is the principal function of banking industry, the management of banks should give more attention analyze and take the necessary measures or action on time internal as well as external factors that affect or limit lending. Without lending, banks' incomes especially interest income would highly deteriorate and affect bank survival. In case, since nonperforming loans (NPLs) has a direct reflection of poor asset quality, the factors that influence banks loans have their own impact on NPLs (Rawlin *et al.* 2012).

According to Reed and Gill (1989) cited in Zewdu (2010) (internal and external factors are Affect the lending activities of the bank. which leads poor asset quality, highly deteriorate income and affect bank survival) therefore, the factors that influence bank loans, that might have their own impact on NPLs are capital position, profitability, stability of deposits, economic conditions, influence of monetary and fiscal policies, ability and experience of bank personnel and credit needs of the area served.

A study by Black and Daniel, (1989), interest rate and liquidity of fund are factors that affect bank lending and investing activities.

2.3.2. Single Country Studies

One of the studies in this regard is that of Ranjan and 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.

According to Louzis et al, (2010) examine the determinants of NPLs in the Greek financial sector using fixed effect model from 2003-2009 periods. The variables included were return on asset, return on equity, capital adequacy/solvency ratio, and loan to deposit ratio, inefficiency, credit growth, lending rate, bank size, GDP growth rate, lending rates and unemployment rate. 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.

Similarly, Joseph (2011) who conducted study on the title of effects of interest rate spread on the level of non-performing assets of commercial banks in Kenya was considered interest rate spread/cost of loan as independent and NPLs ratio as dependent variables. The study applied descriptive research design. Both primary and secondary data were considered from 43 commercial banks in 2010. It was analyzed by the help of SPSS software. The finding indicates that cost of loan/lending rate has a positive significant effect on the occurrences of NPLs.

However, Swamy (2012) conduct study to examine the macroeconomic and indigenous determinants of NPLs in the Indian banking sector using panel data a period from 1997 to 2009. The variables included were GDP growth, inflation rate, per capital income, saving growth rate, bank size, loan to deposit ratio, bank lending rate, operating expense to total assets, ratio of priority sector's loan to total loan and ROA. The study revealed

that real GDP growth rate, inflation, capital adequacy/solvency ratio, bank lending rate and saving growth rate had insignificant effect; whereas ROA and loan to deposit ratio has strong positive effect but bank size has strong negative effect on the level of NPLs.

According to Saba et al.(2012) on the issue of “Determinants of Nonperforming Loan in US banking sector” also investigate the bank specific and macroeconomic variables of nonperforming loans from 1985 to 2010 period using OLS regression model. They considered lending rate, total loans, and Real GDP per capital as independent variables. The finding reveals as real total loans have positive significant effect whereas interest rate and GDP per capital has negative significant association with NPLs.

Hyun and Zhang (2012) investigated the impact of macroeconomic and bank-specific factors of nonperforming loans in US for two distinct sub-sample periods that is from 2002-2006 (pre financial crisis) and 2007-2010 (during financial crisis).The variables included both macroeconomic factors namely GDP growth rate, unemployment rate and lending rate, and bank specific variables such as Return on Equity (ROE), solvency ratio, inefficiency, bank size and non-interest income. In pre financial crisis period, the study found as solvency ratio, ROE, lending rate, GDP growth rate and unemployment rate negatively affect NPLs. Negative effect of lending rate on NPLs implies that an increase in lending rate curtail peoples' /business entity's' ability to borrow, which decreases the amount of loan and then reduce NPLs. Beside, statistically significant and negative solvency ratio effect on NPLs, implies that the higher the Solvency ratio, The lower the incentives to take riskier loan policies, and consequently, reduce the amount of problem loans. However, bank size has no effect. During financial crisis also solvency ratio, GDP growth rate, unemployment rate and ROE all have a negative impact on NPLs while lending rate has no significant effect on NPLs. Size allows for more diversification opportunities as larger banks can compose less concentrated portfolios that include borrowers from different industries, geographical Locations, capital size and other customer segments.

Similarly, Farhan et al.(2012) on the title of “Economic Determinants of Non-Performing Loans: Perception of Pakistani Bankers” utilized both primary and secondary data in 2006 years. Correlation and regression analysis was carried out to analyze the impact of selected independent variables. The variables included were interest rate,

energy crisis, unemployment, inflation, GDP growth, and exchange rate. The study found that, interest rate, energy crisis, unemployment, inflation and exchange rate has a significant positive relationship whereas GDP growth has insignificant negative relationship with the non-performing loans. According to an Empirical Study made on Commercial Banks in Pakistan by Badar & Yasmin, (2013) on the title of “Impact of Macroeconomic Forces on Nonperforming Loans” the long and short run dynamics between nonperforming loans and macroeconomic variables covering the period from 2002 -2011 of 36 commercial banks in Pakistan were assessed. In the stud, inflation, exchange rate, interest rate, gross domestic product and money supply were included as macroeconomic variables. They applied vector error correction model. The study found that as there is strong negative long run relationships exist of inflation, exchange rate, interest rate, gross domestic product and money supply with NPLs.

However, study on Konfi, (2012) who conducted study on the determinants of nonperforming loans on the operations of SINAPI ABA TRUST microfinance institutions in Ghana found as high interest rate was not significant factors causing the incidence of NPLs. This study justifies as interest rate is only applicable to loan defaulters who have managed to pay off outstanding principal and are in default in only interest payment. If a borrower is in default of both principal and interest, then one cannot assert that high interest rate is the actually the cause of the loan default.

Besides, Ahmed and Bashir, (2013) conducted a study on the “Macroeconomic Determinants of Nonperforming Loan of Banking Sectors in Pakistan”: The study was conducted on 30 commercial banks from total of 34 banks in 1990-2011 periods. The main aim of the study was to investigate impact of inflation, credit growth, GDP growth rate, Unemployment rate, consumer price index and lending/interest rate, on nonperforming loan. They revealed negative effect of GDP growth rate and lending rate on NPLs. The explanation of negative effect between lending rate and nonperforming loans implies that as lending rate increase, individuals with funds starts

Saving with the banks to earn on their funds but investors with the profitable projects feel reluctant to borrow and invest. Besides, existing borrowers pay back their loans to keep their credit rating good as to get loans in the future at discount rates. Similarly, on their study of banks specific factor of NPLs of banking sectors in Pakistan from 2006-

2011 in 2013, they found positive significant effect of ROA but insignificant effect of ROE on NPLs. The explanation of positive significant association between return on equity and nonperforming loans implies that in order to increase the short term earnings, banks management describe wrong picture to the investors relating the future profitability and positive return prospects. Consequently, investors start borrowing from the banks and invest in the less profitable projects. This results in the current good performance and profitability of the banks but because of the wrong forecasting, returns on the investments are not according to the investors' expectation, resulting in the inability of the investors in repayment of loans thus leading to the growth in NPLs.

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

Besides, Daniel and Wandera, (2013) conducted the study on the effects of credit information sharing on the nonperforming loan of commercial banks in Kenya. The objectives of the study was to assess the impact of credit information sharing on nonperforming loans, to identify the factors that account for bad loans and to determine the economic sector that records higher NPLs and the efforts taken to reduce the risk in this sector. Data was collected from primary sources and secondary data between 2007 to 2012 period. The variables included in the study were Information Asymmetry; Interest/lending rates, Management of loans and legal framework and Credit Criteria. The study found as lending rates has positive significant effect on NPLs. It justifies as these causes make many borrowers not to pay their loans hence leading to many bad loans.

A study on Tomak (2013) conducted on the "Determinants of Bank's Lending Behavior of commercial banks in Turkish" for a sample of eighteen from 25 banks. The major objective of the study was to identify the determinants of bank's lending behavior. The

data was covered 2003 to 2012 consecutive years. The variables used were access to long term funds. Bank size, interest rates, GDP growth rate and inflation rate, The finding reveals that bank size, access to long term loan and inflation rate have positive and significant impact on the bank's lending behaviour but, interest rates and GDP are insignificant.

Similarly, Shingjergji, (2013) conducted study on the "impact of bank specific factors on NPLs in Albanian banking system". In the study, capital adequacy ratio, loan to asset ratio, net interest margin, and return on equity were considered as a determinant factors of NPLs. The study utilized simple regression model for the panel data from 2002 to 2012 period and found as capital adequacy ratio has negative but insignificant whereas ROE and loan to asset ratio has negative significant effect on NPLs. Besides, total loan and net interest margin has positive significant relation with NPLs. The study justifies that an increase of the capital adequacy ratio will cause a reduction of the non-performing ratio. Besides, an increase of return on equity will determine a reduction of NPLs ratio. Besides, Mileris, (2012) on the title of "macroeconomic determinants of loan portfolio credit risk in banks" was used multiple and polynomial regression model with cluster analysis, logistic regression, and factor analysis for the prediction. The finding indicates that NPLs are highly dependent of macroeconomic factors.

2.3.3. Empirical Studies in Ethiopian Banks

In the Ethiopia context, there are few studies that examine factors affecting asset quality of Ethiopian commercial banks. To the knowledge of the researcher there are four studies conducted on determinants of loan defaults. Those studies are the work of (Daniel, 2010), (Habtamu, 2015), (Tilahun and Dugasa, 2014) and (Wondimagegnehu, 2012), This particular section provides a detailed review of those related studies conducted in the context of Ethiopia.

According to Daniel (2010) had conducted a research titled "privately owned commercial banks in Ethiopia: issues of non-performing loans". The study was on the non-performing loan management of private commercial banks in Ethiopia. To achieve this main objective the researcher examined nature of NPLs, trend of NPLs, proportion of NPLs with total loan and advance, and determinants of non-performing loans. The research has found that moral hazard of the borrowers, ineffective monitoring, and

operational loss of the borrower were the reasons for high nonperforming loan in private commercial banks in Ethiopia during the sample period.

A study on Habtamu, (2015) “Assessment of factors affecting non-performing loans: The case of Ethiopian Private commercial Banks”) assessed bank specific factors affecting occurrence of nonperforming loans in Ethiopian private commercial banks. A survey study research design of six private Banks was employed in his paper. Interviews and questionnaires to bank officers who involve in lending activities for at least five years were used to collect data for the study. The data was carefully coded and entered to SPSS software and analyzed by descriptive statistics. Accordingly the findings of the study reveals that the major factors affecting NPLs were poor loan follow up, poor credit assessment, lenient credit terms, unfair competition among banks compromised integrity, underdeveloped credit culture and conditions, knowledge limitation, And also the researcher found that bank size and credit growth have no or very minimal relationship with occurrence of NPLs. Findings of (Habtamu, 2015) study further indicated that non-performing loans have negatively affected the performance of Ethiopian private banks in terms of credit crunch and profitability.

In a study titled “Bank- specific determinants of credit risk: empirical evidence from Ethiopian Banks” (Tilahun and Dugasa, 2014) examined the bank specific determinants of credit risk in Ethiopian commercial banks. The study used quantitative research approach and balanced panel data of 10 commercial banks both private owned and state owned for the period between 2007 to 2011 has been analyzed using random effects GLS regression model. The study revealed that found that bank size and credit growth have negative and statistically significant impact on the level of credit risk whereas, ownership and operating inefficiency have positive and statistically significant impact on credit risk. Finally, the results shown that capital adequacy, profitability (ROA) and bank liquidity have negative but statistically insignificant relationship with credit risk.

According to Wondimagegnehu, (2012) investigated the determinants of NPLs in the context of Ethiopian Commercial Banks. The main objective of this research was to identify bank specific determinants of non-performing loans. To achieve this objective, the study used mixed research approach. More specifically, the study used survey of

employees of banks, structured survey of documents of bank reports and unstructured interview of senior bankers.

The findings of the study showed that, most likely factors that affect occurrences of non-performing loans in Ethiopian Private commercial banks are poor credit assessment, failed loan monitoring, aggressive lending, underdeveloped credit culture, lenient credit terms and conditions, weak institutional capacity, compromised integrity, wilful default by borrowers, unfair competition among banks and knowledge limitation, fund diversion for unintended purpose, and over/under financing by banks. The result showed that at 0.05 level of significant, there were no statistically significant relationship between all independent variables and NPL.

Based on the study, the researcher recommended that banks should put in place a vibrant credit process that ensures proper customer selection, authentic sanctioning process, robust credit analysis, , proactive monitoring and clear recovery strategies for sick loans; formulate a clear policy framework that addresses issues of conflict of interest, ethical standard and check and balance in credit process; organizational capacity enhancement of banks; deliberate effort to develop culture of the public towards credit and its management by banks and ensuring prudent policies that govern bank loans.

2.4. Summary and literature gap

The empirical literatures that are discussed so far showed that, banks NPLs are determined by both macroeconomic and bank specific factors. However, Most of the literatures that are discussed so far appeared to have focused on studies that were conducted in the banking sector of different outside countries. This is because only few studies have assessed the determinants of asset quality like NPLs in Ethiopian context, despite the fact that a small number of studies were conducted by different researchers on the Ethiopian Banking sector. In most of the studies, NPLs are only considered as additional explanatory variable and not deeply investigated. Consequently, the Banking sectors in Ethiopia have so far received inadequate attention in the literature review of asset quality.

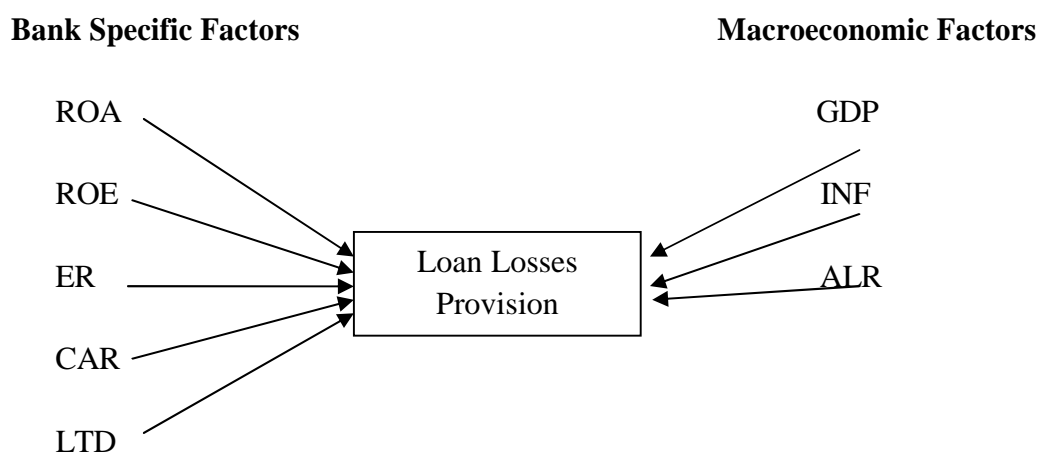
According to study of (Wondimagegnehu, 2012), (Daniel, 2010), (Tilahun and Dugasa, 2014) and (Habtamu, 2015), (Gadise, 2014) assessed the determinants of NPLs in

Ethiopian commercial banks by using bank-specific variables. Accordingly, as per the knowledge of the researcher, most studies conducted in Ethiopian banking sector clearly failed to identify macroeconomic determinants of asset quality.

In general, the lack of sufficient research and inconsistent results among the researchers on the determinants of asset quality in Ethiopia banking sector and most of the existing studies being only focus on the banks specific determinants of asset quality, Hence, the purpose of this study is to investigate the determinants of asset quality in Ethiopian private commercial banking sector by adopt an econometrics model so as to estimate both the bank specific and macroeconomic determinants of asset quality which is proposed to fill the existing literature gap.

2.6. Conceptual Frame Work

From the literature review, discussed above, the researcher constructed the following conceptual framework to summarize the main focus and scope of this study in terms of dependent and independent variables, Selection of variables are guided by previous researches, objective of the study and the study area the researcher review of different papers regarding the issue of NPLs and LLPs, the researcher pensive that those variables are the major determinants of asset quality of Ethiopian commercial banks, the dependent variable is loan losses provision and the bank specific and macroeconomic factors are independent variables as follows.



Source: Developed by the researcher

2.7. Research Hypothesis

The ultimate purpose of this study is to examine the determinants of asset quality in Ethiopia private commercial banks. The empirical studies made around the world demonstrate various outcomes on determinants of asset quality of the financial sectors. From the review of empirical literature, the researcher perceived as there is no consistency in the results for the determinants of nonperforming loans.

In this section the researcher develops testable hypotheses to examine the relationship between bank specific and macroeconomic determinants of asset quality on Ethiopia private commercial banks. Thus, based on reviewed related literatures, the researcher developed the following null hypotheses to estimate the sign relationship of bank specific and macroeconomic determinants with provision of loan losses in Ethiopia private commercial banks, Based on empirical evidence reviewed in the literature parts, since the statement or the statistical hypothesis that is actually being tested. (Brooks 2008)

The following Null hypotheses will be tested.

H1. Return on asset (ROA) has negative and significant effect on LLPs.

H2. Return on equity (ROE) has negative and significant effect on LLPs

H3. Loan to deposit rate (LTD) has positive and significant effect on LLPs

H4. Capital adequacy ratio (CAR) has negative and significant effect on LLPs

H5. Efficiency ratio (ER) has negative and significant effect on LLPs.

H6. Gross Domestic Product (GDP) has negative and significant effect on LLPs

H7. Inflation rate (INF) has Positive and significant effect on LLPs.

H8. Average lending rate (ALR) has Positive and significant effect on LLPs.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter is discussed in details on the Research Design and Approach, Population and Sampling Design, Data Collection Methods, model specification and presents and discusses method of data process and analysis, the purpose of the research which is identifying the bank specific and macroeconomic determinants of asset quality the case of Ethiopia private commercial banks. Accordingly, Data will be gathered from national bank of Ethiopia. Moreover, annual reports of Ministry of Finance and Economic Development (MoFED) and Central Statistics Agency (CSA) were used to get GDP growth and the Consumer Price Index (CPI) data respectively. The data covered the time period of 2000 to year 2016. Finally, definition of study variables with their measurement and model specifications are presented.

3.2 Research Design and Approach

Research design is a master plan specifying the methods and procedures for collecting and analyzing the required data. The choice of research design depends on objectives that the researchers want to achieve (John, 2007). Since this study was designed to examine the determinants of asset quality, a logical reasoning either deductive or inductive is required. Deductive reasoning starts from laws or principles and generalizes to particular instance whereas inductive reasoning starts from observed data and develops a generalization from facts to theory. Besides, deductive reasoning is applicable for quantitative research whereas inductive reasoning is for qualitative research. Thus, due to quantitative nature of data, the researcher used deductive reasoning to examine the cause and effect relationships between Asset quality and its determinants in this study. It does so from theory-based expectations on how and why variables should be related. Hypotheses could be basic (i.e., relationships exist) or could be directional (i.e., positive or negative). The quantitative data gathering methods are useful especially when a study needs to measure the cause and effect relationships evident between pre-selected and discrete variables (Addisu, 2011).

As noted by Kothari (2004), explanatory research design examines the cause and effect relationships between dependent and independent variables. Therefore, since this study was examined the cause and effect relationships between asset quality and its determinant, it is an explanatory research. Therefore, the researcher employed quantitative Research approach to see the regression result analysis with respective empirical literatures on the determinants of asset quality. Thus, the researcher was used a panel data from 2000 to 2016 period. panel data can better identify and measure effects that simply cannot be observed in cross-section or time series data (Gujarati, 2004).

3.3. Population and Sampling Design

3.3.1. Target Population

A population is the total collection of elements about which the researcher makes some inferences. The collection of all possible observations of a specified characteristic of interest is called a population while a collection of observations representing only a portion of the population is called a sample. In this study, the target population is the banking sector in Ethiopia. The target population for this study was six senior private commercial banks that were registered by NBE before 2000 G.C and operated in the country. Currently, the country has sixteen private owned commercial banks licensed and registered by the NBE.

3.3.2. Population and Sampling Techniques

Population is the list of elements from which the sample may be drawn (John, 2007). Sampling is a technique of selecting a suitable sample for the purpose determining parameters of the whole population. A sample is drawn to overcome the constraints of covering the entire population with the intent of generalizing the findings to the entire population. The target population for this study was six private commercial banks out of sixteen private commercial banks that were licensed and registered by NBE and operated in the country. The researcher chooses those six selected private commercial banks because they have large size of asset classification, reported on NBE 2014/2015. The researcher chooses those selected banks because of large size of asset classification

the bank's ability to provide high amounts of loan to borrowers, this may lead high amount of nonperforming loan and it require high loan losses provisions.

3.3.3. Sampling Design and Sample Size

For this research the target population are private banks registered by National Bank of Ethiopia (NBE) and under operation, private banks were selected since it is difficult to compare private banks with that of government owned banks as the play ground is not equal for both private and state owned banks, state owned banks mostly share policy favour by the government not applicable to the private banks.

This study bank are stratified in to three levels the researcher used the total asset of selected banks for classification. According to the NBE, banks are classified as large, mid-size and small, for assets of greater than 9 billion between birr 3 billion and birr 9 billion and less than birr 3 billion respectively.

The selection criteria set by the researcher was first, the required banks are only private commercial banks that operated in Ethiopia, and second those private commercial banks should operate before 2000 G.C having financial statements for consecutive sixteen years. Third the large size of asset classification that is greater than 9 billion birr. Therefore, this study employed purposive sampling technique to select the required sample of banks from all private commercial banks listed by NBE, The major drawback of purposive sampling is making description rather than generalization (Dawson 2002). The researcher considers that the sample size is sufficient to make sound conclusion about the population as far as it covers around 40% of the total population. Moreover, the big portion of total loans and non-performing loans of private commercial banks is found in the banks selected as sample below,

Table 1: List of sample banks selected for this research.

No	Name of Banks	Years of Establishment
1	Awash International Bank	1994 G.C
2	Dashen Bank	1995 G.C
3	Bank of Abyssinia	1996 G.C
4	Wegagen Bank	1997 G.C
5	United Bank	1998 G.C
6	Nib International Bank	1999 G.C

To this end, the sample size of this study is not less than specified sample size required for ones' study since the accuracy and validity of the works never guaranteed by increasing the sample size beyond specified limit. This is due to the fact that increasing the number of sample size beyond the specified sample size required for ones' study never add value to the accuracy of the study rather it made information unmanageable due to redundancy (Ayalew, 2011)

3.4. Method of Data collection

This study used panel data by combining time series and cross-section observations. It gives more informative data. According to Gujarati, (2004). Panel data can better identify and measure effects that simply cannot be observed in cross-section or time series data in this study quantitative data collection method was used. The data were collected from the National Bank of Ethiopia (NBE), which regulates the banking sector of the country and from the selected 6 banks in Ethiopia. The data collection tools that were employed in this study include examination of relevant documents; review of audit reports, NBE consolidated data and publications. Moreover, reports of Ministry of Finance and Economic Development (MoFEC) which regulates the macroeconomic

issues of the country and also reports of Central Statistical Agency (CSA) that is inflation and real GDP were used as a source of data. Hence, the study period was from 2000-2016, which was 16 years data of the selected commercial banks in Ethiopia.

This study used panel data. The researcher prefers to use panel data since panel data can take heterogeneity among different units into account over time by allowing for individual-specific variables. Besides, by combining time series and cross-section observations, it gives more informative data. Panel data can better identify and measure effects that simply cannot be observed in pure cross-section or pure time series data (Gujarati, 2004).

3.4.1 Procedures of Data Collection

Accordingly, the researcher used secondary sources of data that is panel in nature. A secondary source of data was preferred by the researcher since it is less expensive in terms of time and money while collecting. And also, it affords an opportunity to collect high quality data (Saunders et al (2007) cited in Belay (2012)). Secondary data may either be published or unpublished data (Kothari, 2004). Accordingly, Secondary data is used in the study in order to determine the effect of the factors on asset quality of private commercial banks in Ethiopia. These data includes both bank specific and macroeconomic factors. The macroeconomic variables include inflation, gross domestic product (GDP), average lending rate and bank specific variable like return on asset, return on equity, capital adequacy, efficiency ratio, loan to deposit respectively.

3.5. Method of Data Analysis and Presentation

As noted by Kothari (2004), data has to be analyzed in line with the purpose of the research plan after data collection. Accordingly, secondary data collected from NBE, CSA and head office of each respective bank were analyzed to determine its suitability, reliability, adequacy and accuracy. Thus, this study utilized both descriptive and econometric analysis based on a panel data from 2000-2016 periods to examine the relationship between the asset quality and its determinant factors in selected private commercial banks found in Ethiopia. The data collected from different sources were coded, checked

and entered to simple excel program to make the data ready for analysis. Then the collected data will be process and analyze through Eviews9 software.

For descriptive analysis; table and percentage were used to analyze the data. Besides, results of the descriptive statistics such as mean, standard deviation, minimum and maximum values were reported to describe the characteristics of variables under investigation. Furthermore, various diagnostic tests such as normality, Heteroscedasticity, autocorrelation and multicollinearity test were conducted to decide whether the model used in the study is appropriate and to fulfill the assumption of classical linear regression model. Thus, in order to examine the possible degree of Multicollinearity among variables, correlation matrixes and variance inflation factor were used.

To this end, the researcher is used fixed effect regression model analysis to examine the effect of each explanatory variable on loan loss provision of selected commercial bank in Ethiopia. According to Gujarati, (2004), FEM is appropriate since the number of time series (i.e. 16 year) is greater than the number of cross-sectional units (i.e. 6 private commercial banks). Thus, regression results were presented in a tabular form with the appropriate test statistics and then an explanation of each parameter were given in line with the evidence in the literature.

3.6 Study Variables

Provision of loan losses ratio is dependent variables used in this study. Because LLPs is the main measurement or parameter of asset quality, According to Dugan (2009), loan loss provisioning should reflect the confidence of bank managers about their loan portfolio quality, which means that provisions should cover the entire spectrum of expected credit losses in case they really believe that loan loss provisioning is the best indicator of true credit risk, it is measured in terms of Provision of loan to gross loan. Besides, explanatory variables included in this study are loan to deposit ratio, capital adequacy ratio, return on asset, return on equity, efficiency ratio, lending rate, inflation and GDP.

Table 2: Definition & Measurement of variables

Variables		Definition	Measurement
Dependent Variable			
LLPs	loan losses Provision	Loan losses Provision refers to the amount of loans that has actually been written off during a specific period of time.	loan losses Provision to total loan.
In dependent Variables			
ROA	Return on Asset	represents efficiency in asset utilization and shows how much net income is generated out of assets	Ratio of net profit to total Asset
ROE	Return on Equity	Return on Equity is a profit earned by shareholders for the total amount of shareholder equity invested.	Ratio of net income to total equity
LR	Lending rate	Lending rate is a rate at which interest is paid by a debtor for the use of money that they borrow from a lender.	The average lending rate of banks
LTD	Loan to deposit	Examines bank liquidity by measuring the funds that a bank has utilized into loans from the collected deposits.	Ratio of total credit to Deposit
ER	Efficiency Ratio	Efficiency ratio is the ratio between the non interest incomes at which it is possible to attain a given volume of non interest expenses.	Ratio of operating non interest income to operating non interest expense.

CAR	Capital Adequacy Ratio	Capital Adequacy is a reserve of capital maintained by banks to protect themselves during adverse situation.	Ratio of total capital to total asset
GDP	Gross Domestic Products	Gross Domestic Product is the market price of all goods and services produced in a country.	Real GDP growth (annual %)
INF	Inflation Rate	Inflation rate is the general increase in price of commodities.	Consumer Price Index (CPI)

3.6.1 Dependent variable

Loan losses Provision

Loan loss provisioning policies are estimated to vary from one country to another and they are influenced by accounting practices, regulatory and tax policies of the country. There are two main approaches to provisioning: specific provisioning and general provisioning (Cortovaria et al., 2000). The specific provisioning is determined based on the specific accounting rules and depends on recognized credit losses, which increase the specific reserve for loan losses and are deducted from total assets. The general provisioning needs to cover expected credit losses and is added to the overall reserve for loan losses, on the liability side (banks' balance sheet liabilities). According to Bouvatier and Lepetit (2008), banks do not strictly implement any statistical method to calculate total provisioning, which Loan loss Provision (PLLs) is an expense set aside as an allowance for uncollected loan and loan payments. The provision of loan losses is used to cover a number of factors associated with potential loan losses including customer defaults, bad loans and renegotiated terms of a loan that incur lower than previously estimated payments.

Loan Loss Rate:-We can carry out such a historical analysis of loan portfolio performance by calculating the loan loss rate. The loan loss rate refers to the amount of loans that has actually been written off during a specific period of time. These are explicit losses that an institution has acknowledged because there is no possibility to recover or enforce the loan.

According to Tseganesh (2012), The Ethiopian banking regulation, “Nonperforming loan and advances are a loan whose credit quality has deteriorated and the full collection of principal and/or interest as per the contractual repayment terms of the loan and advances are in question” NBE,(2008). NPL is a loan that delays for the payment of principal and interest for more than 90 days. Deterioration in asset quality is much more serious problem of bank unless the mechanism exists to ensure the timely recognition of the problem. It is a common cause of bank failure. Poor asset quality leads nonperforming loan that can seriously damage a banks’ financial position having an adverse effect on banks operation Lafunte (2012). It distresses the performance and survival of banks Mileris (2012). It is measured or indicated by the amount of provision for doubtful debts to gross loans.

$$LLPs = \text{Provision for Doubtful Debts} / \text{Gross loan}$$

3.6.2 Independent Variables

Independent variables are explanatory variables that explain the dependent variables. In case, independent variable included in this study are indicators of bank profitability return on asset (ROA), return on equity (ROE), solvency/capital adequacy ratio (CAR), loan to deposit ratio (LTD), lending rate (LR), inflation rate (IFR), and efficiency ratio (ER). Gross domestic product (GDP) majority of these variables are modified and adopted from previously done studies based on the extent of their effect on nonperforming loan.

Return on Asset (ROA), represents efficiency in asset utilization and shows how much net income is generated out of assets. It indicates the ability of bank management to generate profits by utilizing the available assets of the bank. Thus, if the ratio of ROA is high, it indicates that it is better performance in order to generate profit. Strong bank profitability measured in terms of ROA might result from high lending rate, fees and

commission that lead bank growth in size and profitability. Thus, ROA gives an idea as to how efficient management is at using its assets to generate earnings, different researchers found different results regarding the relationship between ROA and NPLs. For instance: - Ahmed and Bashir (2013) and Makri et al.(2014,) were examined positive significant relationships between ROA and NPLs. However, Boudriga et a., (2009) and Selma and Jouini (2013) found negative association between NPLs and ROA by supporting the arguments that states deterioration of profitability ratio measured in terms of ROA leads to riskier activities of banks and then raise the level of NPLs. They justified that since ROA represents efficiency in asset utilization, poor utilization of assets leads higher NPLs for the banks. Thus, this ratio is expected to have negative relationships with NPLs in this study. It is measured by the ratio of net profit to total asset as follows;

$$\text{ROA} = \text{Net profit} / \text{Total asset}$$

Return on Equity (ROE), represents the rate of return received from equity invested in banks. It is the amount of net income returned as a percentage of shareholders equity. Return on equity measures profitability by revealing how much profit a bank can produce with the money shareholders have invested. Thus, ROE measures how much the bank is earning on their equity investment. Many researchers were found different results between NPLs and bank profitability measured in terms of ROE. For instance:- Shigjerji(2013) and Ahmed and Bashir (2013) and Makri et al.(2014)found negative relationships between ROE and NPLs. Therefore, this ratio is expected to have negative relationships with NPLs. It is measured by the ratio of net profit to total equity.

$$\text{ROE} = \text{Net profit} / \text{Total equity}$$

Capital Adequacy Ratio (CAR), Capital adequacy is a measure of bank`s financial strength since it shows the ability to withstand/tolerate with operational and abnormal losses. It also represents the ability to undertake additional business (Habtamu, 2012). As noted by Makri et al.(2014), CAR Determines risk behavior of banks. It is a measure of banks solvency ratio and ability to absorb credit risk. Thus, this ratio is used to protect depositors and promote stability and efficiency of financial systems. According to Makri et al.(2014), there is negative relationship with NPLs

indicating a risky loan portfolio is marked by a high NPL (equivalent to high credit risk). However, Djiogap and Ngomsi (2012) found positive association between NPLs and capital adequacy ratio. It is measured by total Equity to total asset ratio. However, it is expected to have negative association with NPLs in this study. This implies that well capitalized banks are less incentive to take risk.

$$\text{CAR} = \text{Total Equity} / \text{Total Asset}$$

Loan to deposit (LTD) Ratio

Loan to deposit (LTD) defined as a ratio examines bank liquidity by determine the funds that a banks has utilized into loans from the collected deposits. It demonstrates the association between loans and deposits. Besides, it provides a measure of income source and also measures the liquidity of bank asset tied to loan (Makri et al.2014). This ratio also measures customer friendliness of banks implies 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 (Ranjan and Chandra, 2003). Thus, it represents a bank's preference for credit. It is credit culture that represents a bank's preference for credit. It is measured in terms of loan to deposit ratio. There is empirical evidence that shows as LTD ratio has significant effect on the level of NPLs of banking sectors in different aspects. In this study, this ratio is expected to have positive relation with NPLs.

$$\text{LTD} = \text{Total Credit} / \text{Deposit}$$

Efficiency ratio (ER)

The relationship between bank operational efficiency of a bank and banks asset quality can be positive or negative. A number of researchers have found a positive (Berger and Humphrey 1992, Wheelock and Wilson 1994) and a negative (Hughes and Moon 1995, Resti1995) relationship between bank efficiency and NPLs. the sign of the coefficient estimate among bank operational efficiency and NPLs is remain indeterminate in this study.

A study on Berger and DeYoung (1997) found a relation between NPLs and efficiency including 57,655 observations of commercial banks between 1985 and 1994 in the U.S. Their research confirmed the “bad management” hypothesis – decreases in efficiency are most of the time followed by higher ratios of NPLs, proof that “bad management” are not only manifested in additional expenditures but also in below level underwriting and monitoring practices that lead to higher levels of NPLs (Berger & DeYoung, 1997).

A study by Hughes et al.(1995), link risk taking to banks’ operating efficiency. The argument is that risk adverse managers are willing to trade off reduced earnings for reduced risk, especially when their wealth depends on bank performance. In order to improve loan quality, bank will increase continuous monitoring and incur higher amount of costs, affecting the right measurements of operating efficiency. Therefore, a less cost efficient bank may in fact hold a low risk portfolio. When banks list the loan amount for collection, they will incur extra operating costs from non-value-added activities to handle and supervise the loan collection process. These non-value-added activities consist of constantly tracking the debtor’s financial status, being cautious of the collateral value, discussing the amortization plan, paying expenses for contract negotiation, calculating the costs to withhold, deposit and dispose of collateral at the time the loans become non-payable. Basically, non- performing loans are a result of compromise objectivity of credit appraisal and assessment. The problem is aggravated by weakness in accounting disclosure and grant of additional loans. In assessment of current loans status, the borrower’s credit worthiness and the market value of collateral are not taken into account thereby rendering it difficult to spot bad loans (Tihitina A, 2009), Income to Cost ratio of commercial banks in Ethiopia used as a proxy measurement to capture the operational efficiency of banks.

$$ER = \text{Operating non-interest income} / \text{Operating non-interest expense}$$

Average Lending Rate/Interest Rate (ALR)

Lending rates are one of the primary economic determinants of asset quality. It is the cost of borrowed funds. Interest rate spread is a measurement of profitability between the cost of short term borrowing and the return on long term lending. Interest rate spread affect

performing assets in banks as it increases the cost of loans charged on the borrowers (Joseph, 2011). Interest rate is the price a borrower pays for the use of money they borrowed from the lenders. Interest can be thought of as rent of money. Thus, lending rate is a rate of return usually remains in admittance of monetary regulators (NBE) to manipulate the pursuance of monetary objectives. In case, maximum and minimum lending rate is set by NBE. There is empirical evidence showing a positive and negative association between lending rate and NPLs. For instance: - Saba et al.(2012) found negative association between lending rate and NPLs whereas Farhan et al.(2012) and Ranjan and Chandra (2003)found as there is a positive relationship with NPLs and lending rate since an increase in interest rate curtails the paying capacity of the borrowers. Thus, lending rate is expected to have positive association with NPLs in this study. Accordingly, this study considers average lending rate (average of Minimum and Maximum Lending Rate) as proxy of lending rate as being commonly used by commercial banks for pricing loans.

Inflation Rate (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. There are ambiguous results regarding the relationship between NPLs and inflation rate.

According to Farhan et al.(2012), Skarica(2013), Klein(2013) and Tomak(2013) found as there is a positive relationship between NPLs and Inflation rate. Theoretically, inflation should reduce the real value of debt and hence make lending easier. However, 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 to hold less cash and make

more trips to banks since inflation lowers the real value of money holdings. It can negatively affect the borrowers' real income when wages are stick. Besides, price stability is considered as prerequisites for ones' countries economic growth (Skarica, 2013).

Thus, Consumer price index is used in this study as the proxy of inflation since most ample measure of inflation defines a change in the price of consumer goods and services purchased by Households. Increase in CPI requires monetary regulators to use measures by increasing the interest rate to control inflation which later increase the cost of borrowing and ultimately cause NPLs. Keeping this information in mind, the relationship between NPLs and inflation is expected to be negative for this study. In case, the figure amount of CPI was taken from CSA.

Gross Domestic Product (GDP)

A strong economic condition measured by GDP, as motivating factor to banks has statistically significant impact on issuance of more private credit to businesses. A strong economic condition creates more demand for goods and services which lead to more investment in different sectors hence increase the per capita income as well as the savings, collectively these factors convince to banks to issue more private credit (kashif and Mohammed, undated).

The performance of any types of loans is highly related to country's economic condition. Keeton and Morris (1987), who investigated the fundamental drivers of loan losses for a sample of nearly 2,500 US commercial banks for the period 1979 to 1985 using simple linear regressions, had already demonstrated that local economic conditions explained the variation in loan losses recorded by banks. To support the above empirical study, Sinkey and Greenwalt (1991) by employing a simple log-linear regression model and data of large commercial banks in the United States from 1984 to 1987. Report that depressed regional economic conditions also explain the loss-rate (defined as net loan charge offs plus NPLs divided by total loans plus net charge-offs) of the commercial banks. Carey (1998) sited in Joseph, Mabvure .T et al, (2012.p.474) also report similar results and suggests that the state of the economy is the single most important systematic factor influencing diversified debt portfolio loss rates.

Table 3: Expected Sign (+/-) of Explanatory Variables in this Study

Explanatory Variables	Expected Sign	Some empirical evidence
Loan to Deposit Ratio	+	Swamy (2012)
Capital Adequacy Ratio	-	hingjerji(2013),Hyun&Zhang(2013), Makri et al.(2014), Klein(2013)
Return on Asset	-	Swamy(2012), Selma and Jouini(2013), Bougriga et al. (2009)
Return on Equity	-	Makri et al.(2014), Klein(2013), Shingjerji(2013)
Lending Rate	+	Farhan et al.(2012), Sakiru et al(2011)
Inflation Rate	+	Farhan et al.(2012), Skarica(2013), Klein(2013), Tomak(2013)
Gross domestic product	-	Louzis et al.(2010), Makri et al.(2014)
Efficiency ratio	-	Berger and DeYoung (1997),Hughes et al. (1995)

Sources: own computation

Notes: A positive sign “+” indicates direct impact; whereas a negative sign “-” indicates an inverse impact of explanatory variables on dependent variable.

3.7 Model Specification

The aim of this study is to examine the determinants of asset quality of commercial banks in Ethiopia. Similar to the most noticeable previous research works conducted on the non-performing loans of financial sectors, this study used loan losses provision as dependent variables whereas Loan to deposit ratio, capital adequacy ratio, return on asset, return on equity, efficiency ratio, Average lending rate, inflation rate, Gross domestic product as explanatory variables. These variables were chosen since they are widely existent for the commercial bank in Ethiopia. Accordingly, this study examined the determinants of asset quality of Ethiopian private commercial banks by adopting a model that is existed in most literature. The regression model which is existed in most literature has the following general form; $Y_{it} = \beta_0 + \beta_1 X_{it} + \epsilon_{it}$

Where: - Y_{it} is the dependent variable for firm 'i' in year 't', β_0 is the constant term, β_1 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;

$$LLP_{it} = \beta_0 + \beta_1(LTD)_{it} + \beta_2(CAR)_{it} + \beta_3(ROA)_{it} + \beta_4(ROE)_{it} + \beta_5(ER)_{it} + \beta_6(ALR)_{it} + \beta_7(INFR)_{it} + \beta_8(GDP)_{it} + \epsilon_{it}$$

Where;

- ✓ β_0 is an intercept
- ✓ $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ and β_8 represent estimated coefficient for specific bank i at time t
- ✓ LTD, CAR, ROA, ROE, ER, ALR, INF and GDP represent Loan to deposit ratio, capital adequacy/Solvency ratio, return on asset, return on equity, efficiency ratio, average lending rate, inflation rate and Gross domestic product respectively.
- ✓ ϵ_{it} represents error terms for intentionally/unintentionally omitted or added variables. It has zero mean, constant variance and non- auto correlated.
- ✓ The coefficients of explanatory variable were estimated by the use of ordinary least square (OLS) technique.

3.7.1. Ordinary Least Square

According to Brooks (2008), ordinary least squares (OLS) or linear least squares are a method to estimate the slope and intercept in a linear regression model. This study used an ordinary least squares (OLS) regression to estimate the linear equation. The rationale for choosing OLS is that, if the Classical Linear Regression Model (CLRM) assumptions hold true, then the estimators determined by OLS will have a number of desirable properties, and are known as Best Linear Unbiased Estimators (Brooks, 2008). In addition, as noted in Petra (2007) OLS outperforms the other estimation methods when the following holds; the cross section is small and the time dimension is short. Therefore, as far as both the above facts hold true in this study it is rational to use OLS regression. Thus, the following section discussed the CLRM assumptions and to employ appropriate panel data regression from random effect, fixed effect and pooled regressions models,

According to Brooks (2008), the assumptions of ordinary least squares are:

- 1) The errors have zero mean.
- 2) The variance of the errors is constant and finite over all values.
- 3) The errors are linearly independent of one another.
- 4) There is no relationship between the error and corresponding x variate.

3.7.2. Diagnostic Analysis

Diagnostic checking is done to test whether the sample is consistent with the following assumptions:

- 1) The model is correctly specified
- 2) No multicollinearity problem. (There is no relationship between independent variables)
- 3) No autocorrelation problem, (There is no relationship among the error term at the period t and the error term at period before t)
- 4) Homoscedasticity, (The error term is constant across the number of observations).

5) The error term is normally distributed.

If all the above assumptions are consistent with the sample, E-view result will be accurate and reliable.

3.8. Model Selection

3.8.1. Choosing Random effect (RE) Versus Fixed Effect (FE) Models

With panel/cross sectional time series data, the most commonly estimated models are probably fixed effect and random effects models. The researcher has used fixed effect regression instead of random effect model because of the following reasons:

- i. According to Gujarati, (2004), noted that if T (the number of time series data) is large and N (the number of cross-sectional units) is small, there is likely to be little difference in the values of the parameters estimated by fixed effect model/FEM and random effect model/REM. Hence, the choice here is based on computational convenience. On this score, FEM may be preferable since the number of time series (i.e. 16 year) is greater than the number of cross-sectional units (i.e. 6 private commercial banks).
- ii. According to Brooks, (2008); Verbeek, (2004) and Wooldridge, (2004), it is often said that the REM is more appropriate when the entities in the sample can be thought of as having been randomly selected from the population, but a FEM is more plausible when the entities in the sample effectively constitute the entire population/sample frame. The sample for this study was not selected randomly rather purposively and as such FEM is more appropriate than REM.

Based on the above theoretical backgrounds in to consideration, the researcher has adopted fixed effects regression model instead of random effect model.

Chapter Four

Results and Discussion

Introduction

In the previous chapter the research design employed in this study is presented and discussed in detail. The aim of this chapter is to present results and analysis of data involved in this study. Hence, the descriptive statistics of all the variables used in this study and the results of hypothesis are tested i.e. the estimated parameters of multiple regression analysis is employed to test whether one or more independent variables (predicators) influence the dependent variable (outcome variable) and to identify whether the effect is positive or negative their significance, the connection between the independent variables and dependent variable according to the sign and the value of the parameters for the regression model are presented and discussed in detail.

4.1. Descriptive statistics

The summary of descriptive statistics that was intended to give general descriptions about the data both dependent and independent variables is presented in Table 6. The total number of observation for each variable was 92 (i.e., data for 6 banks for the period from the year (2000 to 2016). Accordingly, mean, median, standard deviation, minimum and maximum values of each variable were used so as to show the overall trend of the data over the period under consideration

Table 4: Summary of descriptive statistics for dependent and independent variables

Variables	Observations	Mean	Median	Max	Min	Standard Deviation
LLPs	96	3.53	3.17	8.89	0.021	1.70
CAR	96	14.33	13.66	29.44	6.43	4.16
ER	96	113.8	108.85	250.15	39.47	42.52
GDP	96	9.12	10.25	12.6	-2.1	3.91
INF	96	12.22	10.35	36.4	-10.6	11.68
LIR	96	11.53	11.88	12.75	10.5	0.76
LTD	96	70.55	68.26	105.53	48.85	14.3
ROA	96	2.61	2.8	4.86	0.2	1.09
ROE	96	20.68	21.37	42.29	1.39	7.83

Source: National Bank of Ethiopia and own computation

Note: provision of Loan losses (PLLs), Capital adequacy ratio (CAR), Efficiency ratio(ER), Growth domestic product (GDP), Inflation (INF), lending interest rate (LIR), Loan to deposit rate (LTD), Return on asset (ROA), Return on equity (ROE).

As can be seen from table 4, for the total sample, the mean of LLPs was 3.53% with a minimum of 0.02% and a maximum of 8.89%. This indicates that, from the total loans those Ethiopian private commercial banks provisions, an average of 3.53% were being loan losses provision over the sample period. The lowest LLPs ratio that Ethiopian private commercial banks experienced over the sample period was 0.02%. On the other extreme, the highest LLPs ratio of Ethiopian private commercial banks was 8.89%. The disparity between the minimum 0.02% and the maximum 8.89% of LLPs and The standard deviation (1.70%) respectively this indicate BOA scored highest LLPs 8.89% in 2008 G.C this shows that BOA is deteriorated income in 2008 as a result of pure asset quality.

Regarding bank specific independent variables, as stated in the above table 4, from the total of 96 observations over the sample period of 2000 to 2016, CAR measured by total equity divided by total assets.. The mean value for capital adequacy ratio (CAR) was 14.33% whereas the maximum level was 29.44% and minimum one was 6.43% with a standard deviation of 4.16%. the sample private commercial banks in Ethiopia during study period was above the minimum requirement, which is 8% this showing better risk withholding ability of banks as per the National bank of Ethiopia,

The mean value of banks efficiency ratio is 113.8 percent. The mean value implies that almost all private commercial banks in Ethiopia are efficient on their cost allocation. There were great differences between banks efficiency, because the standard deviation is very high (42.52%). The maximum and minimum values were 250.15 percent and 39.47 percent respectively. The standard deviation also shown 42.52% this explains that a great variation between each sample banks efficiency.

As far as profitability ratios concerned, ROA records a minimum of 0.02% and maximum of 4.86% with a mean value of 2.61%. The standard deviation also had shown 1.09 %. A high ROA indicate better performance in the management of efficient utilization of asset, private commercial banks in Ethiopia.

ROE measured by the net profit divided by total equity of the bank measures how much the banks are efficiently earning from funds invested by its shareholders. As shown in the above table 6, ROE records a minimum of 1.39% and maximum of 42.29% with a mean of value of 20.68%. The standard deviation also had shown 7.83 %.

The mean value of loan to deposit ratio was 70.55% which shows that the average value of banks loan to deposit ratio was very high, again it tells us on average loans are the most important asset for private commercial banks in Ethiopia. The standard deviation 14.3 percent reveals that there was high variation towards the mean among banks in Ethiopia. The maximum and minimum values were 105.53% and 48.85 % respectively.

The coefficient sign of loan to deposit ratio shows that there is a positive relationship between banks loan loss provision and loan to deposit ratio. Loan to deposit ratio had positive and statistically significant (p-value = 0.043) at 5% significant level. The result is in line with the third research hypothesis which is based on the argument that when

banks lending increase as compared to the deposits the level of NPL also increase. Because at the time of low loans to deposits ratio in order to earn more banks start lending even to the low quality borrowers and do not follow the standard loan allocation practices, which leads to the growth in nonperforming loan. Therefore, the result implies that every one percent change (increase or decrease) in bank's loan to deposit ratio keeping the other thing constant has a resultant change of 14.34% on the nonperforming loan in the same direction. From the coefficient value loan to deposit ratio is a very important determinant of Loan losses provision in Ethiopian banking industry. So, third research hypothesis (i.e. H3. Loan to deposit rate (LTD) has Positive and significant effect on loan losses provision.) Also fail to reject.

Among macroeconomic variables employed in this study, the average real GDP growth in Ethiopia for the sample period was 9.12%, with a standard deviation of 3.91% implies the economic growth in Ethiopia during the sample period remains stable as compare to inflation rate,

On the other hand inflation had, the mean value of inflation in Ethiopia had for the sample period was 12.22, and a standard deviation was 11.68%. This implies that inflation rate in Ethiopia during the study period remains somewhat unstable as compare to real GDP.

Finally, the mean value of average lending interest rate over the period under study was 11.53%, and there is a modest variation on interest rate margin toward its mean value over sixteen consecutive years because the value of standard deviation is below one percent (0.07%). with the maximum and minimum values of 12.75 % and 10.5 respectively. This indicates that the ALR of Ethiopian private commercial banks was highly stable over the sample period.

4.2. Tests for the Classical Linear Regression Model (CLRM) Assumptions

In the descriptive statistics part, the study shows the mean, standard deviation, minimum and maximum values of the dependent and explanatory variables including the number of observation for each variable during the period under consideration, that is from 2000-2016. However, this section provide test for the classical linear regression model (CLRM) assumptions such as normality, heteroscedasticity, autocorrelation and multicollinearity tests. as far as the assumptions of classical linear regression model hold true, The linearity of the parameter is assumed since the model applies linear ordinary least square (OLS). The objective of the model is to predict the strength and direction of association among the dependent and independent variables and usually known as Best Linear Unbiased Estimators (BLUE). Hence, the following sections discuss results of the diagnostic tests (i.e., heteroscedasticity, autocorrelation, multicollinearity, normality and model specification test) that ensure whether the data fits the basic assumptions of classical linear regression model or not.

4.2.1. Heteroskedasticity

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 Brooks (2008). Heteroscedasticity test is very important because if the model consists of heteroskedasticity problem, the OLS estimators are no longer BEST and error variances are incorrect, therefore the hypothesis testing, standard error and confident level will be invalid. . ARCH' test has been made, to ensure that this assumption is no longer violated. The hypothesis for the heteroskedasticity test was formulated as follow;

H0: There is no heteroskedasticity problem.

H1: There is heteroskedasticity problem.

= 0.05

Decision Rule: Reject H0 if P value is less than significant level 0.05. Otherwise, do not reject H0.

Table 5: Result of Heteroskedasticity Test: ARCH

Heteroskedasticity Test: ARCH			
F-statistic	2.167073	Prob. F(1,88)	0.1446
Obs*R-squared	2.163058	Prob. Chi-Square(1)	0.1414

Source: Eview 9 Software and Own computation

As shown in table 5, all versions of the white test statistic (F-statistic, Obs*R-squared and Chi-Square) gave the same conclusion that there was no evidence for the presence of heteroscedasticity in this particular study. Since the p-values of 2.1670, 2.1630 and 0.1414 for F-statistic, Obs*R-squared and Chi-Square respectively were in excess of 0.05, the null hypothesis should not be rejected.

4.2.2. Autocorrelation

It is assumed that the distribution errors are uncorrelated with one another and that the errors are linearly independent of one another. Autocorrelation error occurs when there is a serial correlation between residuals and their own past values. In this study, BreuschGodfrey Serial Correlation LM Test is used to carry out the autocorrelation test. The p-value is obtained to examine whether the autocorrelation problem occurs in the model. If the p-value is more than 5% significant level, it implies that there is no autocorrelation problem in the model. The hypothesis of the model specification test was formulated as follow;

H0: There is no any autocorrelation problem.

H1: There is autocorrelation problem.

$$= 0.05$$

Decision Rule: Reject H0 if P value is less than significant level 0.05. Otherwise, do not reject H0.

Table 6: Result of Autocorrelation Test: BreuschGodfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.008334	Prob. F(2,84)	0.3692
Obs*R-squared	2.250727	Prob. Chi-Square(2)	0.3245

Source: Eview 9 Software and Own computation.

From table 6, it can be concluded that this research do not reject null hypothesis (H_0), since the p value is 0.3245, which is greater than significance level of 0.05. Thus, it can be concluded that the model does not consists of autocorrelation problem.

The DW test statistic value from the regression result is 2.0169 and it is above the lower level and the upper level, it falls on the region of no evidence of autocorrelation problem. At 5% Significant level of 96 observations.

Figure 1. Durbin-Watson DW test

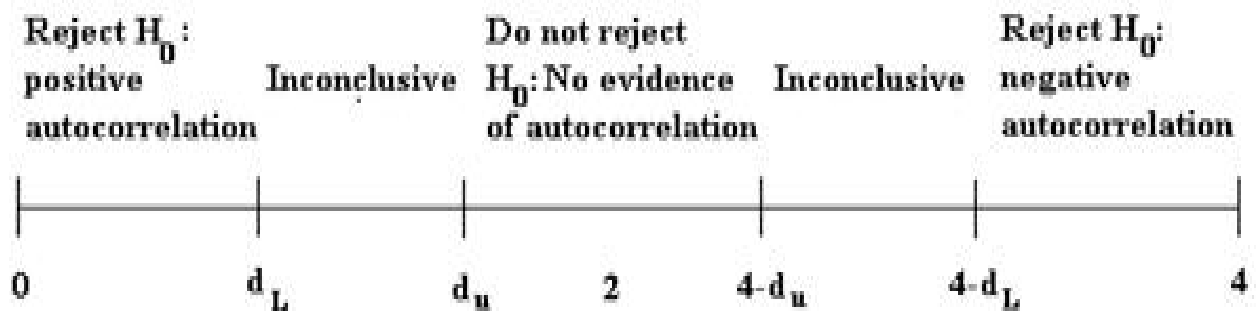


Figure 1 shows as Durbin-Watson has 2 critical values: an upper critical value (d_U) and a lower critical value (d_L).

4.2.3. Multicollinearity

According to Brooks (2008), multicollinearity will occur if some or all of the independent variables are highly correlated with one another. It shows the regression model has difficulty in explaining which independent variables are affecting the dependent variable. If multicollinearity problem is too serious in a model, either additional important variable should be added or unimportant independent variable should be dropped. This study uses high pair-wise correlation coefficients method to detect the existence of multicollinearity high pair-wise correlation coefficients method sees the correlation of independent variables between each other one by one. According to Gujarati (2004), if the correlation coefficient is higher than 0.8, it is considered as the model consists of serious multicollinearity problem.

Table 7: Results of multicollinearity Test: High Pair-Wise Correlation Coefficients

	CAR	ER	GDP	INF	LIR	LTD	ROA	ROE
CAR	1.000							
ER	0.094	1.000						
GDP	0.011	0.390	1.000					
INF	0.062	0.341	0.306	1.000				
LIR	0.304	0.190	0.141	0.197	1.000			
LTD	0.052	-0.394	-0.237	-0.303	-0.528	1.000		
ROA	0.211	0.663	0.470	0.289	0.134	-0.133	1.000	
ROE	-0.347	0.617	0.546	0.225	-0.171	-0.074	0.661	1.000

Source: Eview 9 Software and Own computation.

Table 7 showed that there is no strong pair-wise correlation between the explanatory variables (CAR, ER, GDP, INF,LIR, LTD,ROA and ROE). As a rule of thumb, inter-correlation among the independent variables above 0.80 signals a possible multicollinearity problem. In this study the highest correlation coefficient is 0.663 between return on asset and real efficiency ratio. Thus, it can be concluded that almost all variables have low correlation power which implies no multicollinearity problem in the explanatory variables selected to determine non-performing loans of private commercial banks.

4.2.4. Normality Test

Normality test is used to determine whether the error term is normally distributed. According to Brooks (2008) noted that the Jarque-Bera statistic would not be significant for disturbance to be normally distributed around the mean value. The purpose of the Jarque-Bera test is to make sure that the data set is well-modeled by a normal distribution. The hypothesis for the normality test was formulated as follow:

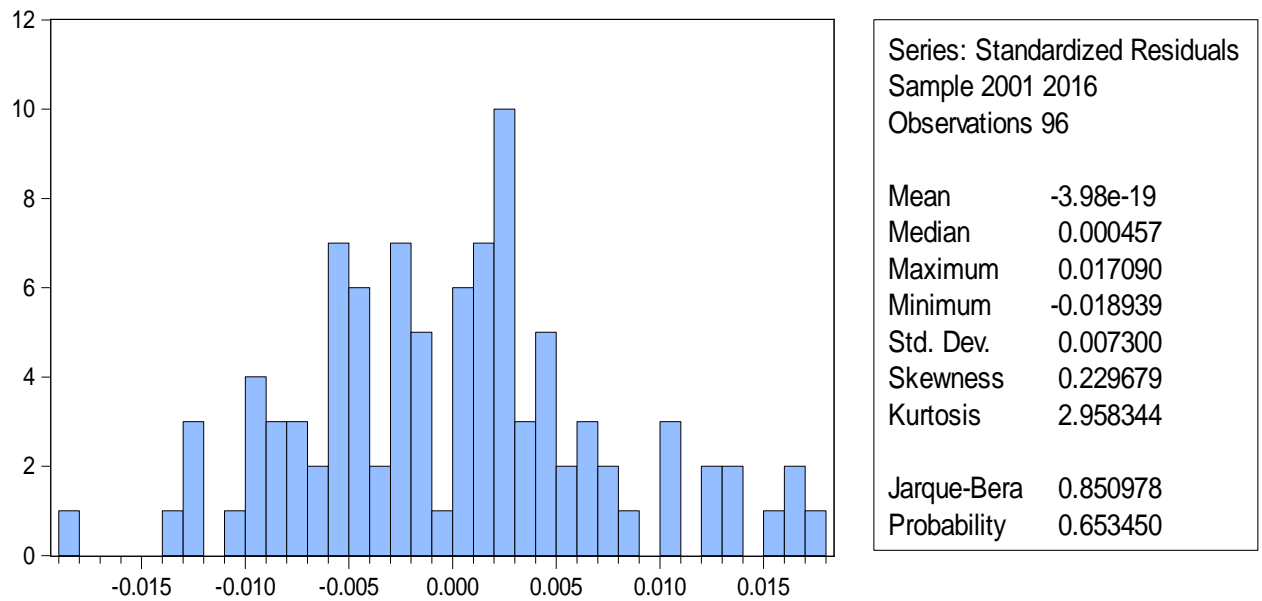
H0: Error term is normally distributed

H1: Error term is not normally distributed

= 0.05

Decision Rule: Reject H0 if P value of JB less than significant level 0.05. Otherwise, do not reject H0.

Table 8: Result of Normality Test: Bera-Jarque test



Source: Eview 9 Software and Own computation.

Table 10 indicated that distribution of the panel observation is symmetric about its mean. The Jarque-Bera statistic has a P-value of 0.65 implies that the p-value for the Jarque-Bera test is greater than 0.05 which indicates that there was no evidence for the presence of abnormality in the data. Thus, the null hypothesis that the data is normally distributed should not be rejected since the p-value was considerably in excess of 0.05

Table 9. Correlation matrix of dependent and independent variables

	LLP	CAR	ER	GDP	INF	LIR	LTOD	ROA	ROE
LLP	1.000	-0.409	-0.114	0.001	0.103	-0.342	0.053	-0.145	-0.05871

Source: National bank of Ethiopia and own computation

As Brooks (2008), if it is stated that y and x are correlated, it means that y and x are being treated in a completely symmetrical way. Thus, it is not implied that can changes in x cause changes in y, or indeed that can changes in y cause changes in x rather, it is simply stated that there is evidence for a linear relationship between the two variables, and movements in the two are on average related to an extent given by the correlation

coefficient.

According to the above table capital adequacy ratio is negatively correlated with loan loss provision with the coefficient of -0.409 and the linear relationship between CAR and LLP is statistically significant, Efficiency ratio is negatively correlated with loan loss provision with the coefficient of -0.114 and the linear relationship between ER and LLP is statistically significant.

Among the macroeconomic factors gross domestic product and inflation rate is affect positively correlated with Loan Loss Provision, the correlation coefficient is 0.001 and 0.103 respectively.

Loan Loss Provision is positively correlated with loan to deposit rate with the coefficient of 0.053 and statistically significant, the bank profitability of return on asset is negative correlated with LLPs and statistically insignificant. The last bank specific variable is return on equity it's correlated with LLPs the coefficient of -0.05871 and statistically significant.

It should be noted that all the above correlation coefficient results merely show the linear association among the dependent (LLPs) and independent variables. In other words, the relationships are not casual (i.e., the change in one variable is not resulted from the movement of the other variable).

4.3. Discussion of Regression results

The empirical evidence on the determinants of asset quality of Ethiopian private commercial banks is studied based on balanced panel data, where all the variables are observed for each cross-section and each time period. The study has a time series segment spanning from the period 2000 up to 2016 and a cross section segment which considered six private commercial banks, namely, Awash International Bank, Dashen Bank, Bank of Abyssinia, Wegagen Bank, United Bank and Nib International Bank. To test the relationship between these private commercial banks loan losses provision and identified loan losses provision determinant variables the following linear regression model is developed.

Table 10: Result of Ordinary Least Square (OLS) Model

Dependent Variable: LLPs

Method: Panel Least Squares

Date: 08/16/17 Time: 22:39

Sample (adjusted): 2001 2016

Periods included: 16

Cross-sections included: 6

Total panel (balanced) observations: 96

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	-0.104716	0.048268	-2.169478	**0.0330
ER	0.010753	0.003682	2.920127	*0.0045
GDP	0.050751	0.030144	1.683602	0.0961
INF	0.015681	0.008109	1.933845	0.0566
ALR	-0.299078	0.151411	-1.975273	**0.0516
LTD	0.017172	0.008494	2.021578	**0.0465
ROA	-0.507609	0.347972	-1.458765	0.1485
ROE	-0.08109	0.03691	-2.196984	**0.0309
C	0.062466	0.022094	2.8273	0.0059
LLPs (-1)	0.606623	0.075936	7.988635	*0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.816589	Mean dependent var	0.0353
Adjusted R-squared	0.784889	S.D. dependent var	0.0170
S.E. of regression	0.007906	Akaike info criterion	-6.6997
Sum squared resid	0.005063	Schwarz criterion	-6.2991
Log likelihood	336.5878	Hannan-Quinn criter.	-6.5378
F-statistic	25.75939	Durbin-Watson stat	2.0169
Prob(F-statistic)	0.000000		

Source: Eview 9 Software and Own computation.

Notes: * significant at 1%, **significant at 5%,

Table 10: showed the empirical result tested by Ordinary Least Square (OLS) from E-views software. The R-squared of this model is 0.816589, which means that 81% of the total variation of Ethiopian private commercial banks credit risk is explained by the total variation of gross domestic product, inflation rate, Average lending rate, capital adequacy ratio, efficiency ratio, loan to deposit, return on asset and return on equity. Whereas, the adjusted R-squared is 0.784889, which means that 78% of the total variation of Ethiopian private commercial banks credit risk is explained by the total variation of gross domestic product, inflation rate, Average lending rate, capital adequacy ratio, efficiency ratio, loan to deposit, return on asset and return on equity. By taking into account the number of independent variables and sample size. Although, the remaining 19% and 22% of the change is explained by other factors which are not included in this study model, both the R-squared and the Adjusted R-squared values in this study are found to be sufficient enough to infer that the fitted regression line is very close to all of the data points taken together (has more explanatory power). For panel data, R-Squared greater than 20% is still large enough for reliable conclusions (Cameron, 2009), (Hsiao, 2007), cited in (Nyamsogoro, 2010).

The dependent variable being regressed is loan loss provisions of Ethiopia private commercial banks which is measured by provision of doubtful loan to total loan ratio. The macroeconomic explanatory variables (gross domestic product and inflation) and bank specific variables (efficiency ratio and loan to deposit) are found to be positive and significant effect of nonperforming loans in private commercial banks of Ethiopia. On the other hand the findings revealed that, there was negative and no significant association among return on asset and loan loss provision in Ethiopian private commercial banks. The following section demonstrates the impact of each explanatory variable on Ethiopian private commercial banks loan loss provision.

4.3.1 Return on Asset (ROA)

Hypothesis testing of the relationship between Return on asset and Ethiopian private commercial banks loan loss provisions:

H1. Return on asset (ROA) has significant effect on loan losses provision.

Result and conclusion, Reject H1 since the regression results of fixed effect model in the above table 13 indicate that Return on asset (ROA) does not have any significant effect on the level of loan loss provision of Ethiopia private Commercial banks, the estimated coefficients and probability of ROA was -0.5076 and 0.1485 respectively, based on the results found that ROA is weather increase or decrease does not affect the level of loan loss provision,

According to Makri *et al.*(2014) identify the factors affecting NPLs of Eurozone's banking systems through difference Generalized Method of the Moments (GMM) estimation they found as return on asset did not show any significant impact on NPL ratio. However, (Selma and Jouini, 2013) conducted a study on Italy, Greece and Spain for the period of 2004-2008 via panel data model and found a significant negative effect of ROA on NPLs. and study made by Boudriga *et al.*(2009) where aggregate country data was used, and Selma and Jouini(2013) where particular country data was used, Swamy(2012) and, Ahmad and Bashir(2013) where single country data was considered. Thus, results of this study examined positive significant effect of bank profitability measured in terms of ROA on the levels of NPLs or LLPs. The main reason for this positive impact of ROA on the levels of LLPs resulted from bank managements' inefficiency on asset utilization and also poor loan quality in the Ethiopia. Thus, the finding implies that commercial banks in Ethiopia are less incentive for return gained from assets and also to provide loans.

To the knowledge of the researcher most studies are not support this results, different researchers revealed that return on asset is positive and negative significant effect on the level of NPLs rather than insignificant effect, the researcher suggested that it needs further studies by other researchers.

4.3.2 Return on Equity (ROE)

Hypothesis testing of the relationship between Return on equity and Ethiopian private commercial banks Loan Loss Provisions:

H2. Return on equity (ROE) has negative and significant effect on loan losses provision.

Result and conclusion, does not Reject H2 since the regression results of fixed effect model in the above table 13 indicate that there is a negative relationship and significant impact of ROE on the level of Loan loss provision. According to the regression result, coefficient of -0.08109 and probability of 0.0309 at 5.% significant level. This means that an increase of return on equity by 1%, on average, will holding other variables constant had result in 0.08% unit decrease on the determinant level of LLPs in the opposite direction.

The expected negative coefficient estimate of return on equity indicated that the profitable of Ethiopian private commercial banks are less engaged in risky activities as they have less pressure to create revenues and ultimately resulted with lower volume of LLPs. This result confirms the finding of Makri et al.(2014) and Boudriga et al.(2009) where aggregate country data was used, Klein (2013), Shingjerji(2013), Ahmad and Bashir(2013) and Hyun and Zhang(2012) where particular country data was used. Also the finding of Louzis et al.(2012) where particular country data was used, this result, as expected, indicates a negative significant effect of ROE on the levels of NPLs. This implies that deterioration of profitability ratio in terms of ROE leads to higher LLPs. This negative significant impact of ROE on the levels of LLPs indicates the existence of better management of funds invested by shareholders via good agency relationships in private commercial banks in Ethiopia.

The expected negative sign between bank performance as measured by return on equity and private commercial banks LLPs result is inconsistent with the result of (Rajan, 1994). The study found a positive correlation between return on equity and NPLs. This is because the banks create higher-risk, lower quality loans to achieve short term profitability at the expense of long term profitability.

4.3.3 Loan to Deposit ratio (LTD)

Hypothesis testing of the relationship between loan to deposit and Ethiopian private commercial banks LLPs:

H3. Loan to deposit rate (LTD) has positive and significant effect on loan losses provision.

Result and Conclusion: Do not Reject H3 since the regression results of fixed effect model in the above table 13 indicate there is a positive relationship and significant impact between loan to deposit and Loan Loss Provisions of Ethiopia private commercial banks, it examines bank liquidity by measuring the fund that a bank has utilized in to loan from collected deposit. According to the regression result, coefficient of 0.0171 and probability of 0.0465 at 5.% significant level, The result is in line with the research hypothesis which is based on the argument that when banks lending increase as compared to the deposits the level of LLPs also increase. Because at the time of low loans to deposits ratio in order to earn more banks start lending even to the low quality borrowers and do not follow the standard loan allocation practices, which leads to the growth in LLPs. Therefore, the result implies that every one percent change is a direct relationship between loans to deposit ratio keeping the other thing constant has a resultant change of 0.017% on the LLPs in the same direction. The result is consistent with Ferreira (2008), (Makri et al.2014), (Ranjan and Chandra, 2003).

4.3.4. Capital Adequacy Ratio (CAR)

Hypothesis testing of the relationship between capital adequacy ratio and Ethiopian private commercial banks LLPs:

H4. Capital adequacy ratio (CAR) has negative and significant effect on loan losses provision.

Result and Conclusion: Do not Reject H4 since the regression results of fixed effect model in the above table 13 indicate there is a negative relationship and significant impact between capital adequacy ratio (CAR) and LLPs. the regression result coefficient of -0.104716 and probability of 0.0330 at 5% of significant level. This means that an increase by 1% of capital adequacy ratio will result in 0.10 % decrease of LLPs, holding

other variables constant. the result of this finding is consistent with the study made by Boudriga *et al.*(2009), and Djiogap and Ngomsi (2012) where aggregate country data was used and , Shingjerji (2013) and Swamy(2012) where particular country data was used, the result of this finding confirms significant negative effect of CAR on the levels of LLPs, by supporting the arguments that state well capitalized banks are better able to resist the levels of risk. Also study by Berger and DeYoung (1997). The result indicates that higher capital requirement protects banks from providing loans to more risky projects. The capital increase improves the bank ability to cope with financial shocks. During the study period when Ethiopian private commercial banks hold higher amount of capital and absorb potential losses during high NPLs.

However, the expected negative coefficient estimate of capital adequacy ratio and loan loss provision is inconsistent with the result of Ahmad and Ariff (2007) and Malick, et.al. (2014). The justification provided in the empirical literature on positive significant association between CAR and LLPs is that high capital adequacy ratio leads banks to involve in high risky activities, create risky loan portfolios, and therefore high NPLs rates.

4.3.5 Bank efficiency ratio (ER)

Hypothesis testing of the relationship between bank efficiency ratio and Ethiopian private commercial banks LLPs:

H5. Efficiency ratio (ER) has negative and significant effect on loan losses provision.

Result and Conclusion: Reject H5 because there is a positive significant relationship between bank efficiency ratio and asset quality. the result of fixed effect regression model in table 13 indicated that bank efficiency ratio have a positive relationship and statistically significant impact on the level of asset quality, According to the regression result coefficient of 0.010753 and probability of 0.0045 at 1% of significant level, This implies that every 1% change (increase or decrease) in bank's efficiency ratio keeping the other thing constant has a result change of 0.1% on the asset quality in the same direction (The result indicates that there is an inverse relationship between bank efficiency and loan losses provision), because of increasing asset quality deteriorated loan losses

provision.

This paper also revealed that a positive sign between operating efficiency and asset quality, If efficiency ratio increases, it shows efficiency, because efficiency is measured using income to cost ratio, the skimping hypothesis shows Berger and (DeYoung, 1997) and (Reddy, 2011) found that the “skimping” hypothesis was in favor for a sub sample of banks that were continuous efficient over time increases in measured operating inefficiency normally lead to high ratios of LLPs, (Reddy, 2011; Williams, 2004).

A study on Mester, (1996). bank efficiency have taken into account asset quality, specifically LLPs. The omission of such a variable might lead to an erroneous bank efficiency measure. This is particularly true since a large amount of non-performing loans may signal that banks use fewer resources than usual in their credit evaluation and loans monitoring process. In addition, a high loan loss provision lead to inefficiency in the banking sector as found by (Altunbas et al, 2000), (Fan and Shaffer, 2004) and (Girardone et al, 2004). This is because efficient banks are better at managing their cost and credit risk as highlighted by (Berger and DeYoung, 1997).

Therefore, the current result implies that bank efficiency is aside to the survival of Ethiopian commercial banks as a whole. Banks should strive hard to manage their cost efficiently so that their objective of profitability can be achieved and the multiplier effects maintained to the maximum.

4.3.6 Gross Domestic Product(GDP)

Hypothesis testing of the relationship between gross domestic product (GDP) and Ethiopian private commercial banks LLPs:

H6. Gross Domestic Product (GDP) has negative and significant effect on loan losses provision.

Result and Conclusion: Reject H6 because, there is a positive relationship and less significant impact between gross domestic product (GDP) and LLPs, According to the regression result coefficient of 0.050751 and probability of 0.0961 it is less significant effect on LLPs . This means that an increase by 1% of GDP growth will result in 0.09 % increase of LLPs ratio, holding other variables constant. This research result is also

consistent with the research of (Shingjrgi, 2013), (Poudel, 2013), and Aver (2008). According to these papers explained that during the economy growth the bank tends to be more careful and alert in selecting the loan borrower by qualifying them based on their credit condition. In conjunction, the bank will reduce the volume of credit when they found out that the economic growths up which is improved the capacity of the borrowers and more interested to borrow money from banks. Besides, the banks will strict in categorized their client and debtor during the economy growth in order to control the loan loss provision, therefore, this result indicates that Ethiopian private commercial banks gave more attention to loan loss provisions and are strict on providing loan during a period of high GDP growth, in order to ensure that the bank will not be exposed to the credit risk.

However, the expected positive coefficient estimate of GDP is inconsistent with (Louzis et al, 2012), (Jakubik, 2007), (Fofack, 2005), (Zribi and Boujelbène, 2011), (Chaibia and Ftiti, 2015), (Park and Zhang, 2010), (Hess, et.al, 2008), (Khemja and Pasha, 2009) result of GDP is negatively and significantly related to non-performing loan of private commercial banks. The justification provided that based on empirical literature, negative association between GDP and NPLs is that higher positive level of real GDP growth usually entails a higher level of income which improves the capacity of the borrower to pay its debts and contributes to reduce bad debts.

4.3.7. Inflation rate (INF)

Hypothesis testing of the relationship between inflation rate and Ethiopian private commercial banks LLPs:

H7. Inflation rate (INF) has Positive and significant effect on loan losses provision.

Result and Conclusion: Do Not Reject H0 because there is a positive and less significant relationship between Inflation rate and Loan loss provisions in Ethiopia private commercial banks. . The regression result on the above table 13, show that the coefficient is 0.015681 and probability is 0.0566. This means that increase inflation by 1%, on average, will result in 0.01% increase of LLPs ratio, holding other variables constant, due to an increase in inflation the profit of the sector had been worsening,

According to the study, increase in loan losses provision during inflation period is explained that during high inflation growth period low quality lending will increase because banks will be in difficulty to evaluate the credit risk of borrowers and cost of borrowing (which is decrease the borrower's ability to repay their debt) monetary regulators will increase interest rate to control the inflation. The positive relationship between LLPs and inflation in Ethiopia private commercial banks indicates that increased inflation has weakened the loan payment capacity of the borrowers by reducing the real profit and the low quality lending increases during high inflation period.

However, the expected positive coefficient estimate of INF and LLPs is inconsistent with (Turan and Koskija, 2014), (Bucur and Dragomirescu, 2014) and (Nkusu, 2011). (Nkusu, 2011), in his study on banking sectors of emerging markets found that higher inflation can enhance the loan payment capacity of borrower by reducing the real value of outstanding debt and this will result on the negative relationship between inflation and non-performing loans.

4.3.8. Average Lending Rate

Hypothesis testing of the relationship between average lending rate and Loan Loss provisions:

H8. Average lending rate (ALR) has Positive and significant effect on loan losses provision.

Result and Conclusion: reject H7 because there is negative relationship and less significant impact on average lending rate and LLPs, in private commercial banks in Ethiopia. According to the regression result, coefficient is -0.299078 and probability of 0.0516, th (solomon, 2016)e result of Fixed Effect Model in the above table 13 indicates statistically significant negative impact of lending rate on LLPs in Ethiopia private commercial banks. This negative sign indicates an inverse relationship between lending rate and LLPs It implies that for one unit change in the banks' lending rate, keeping other thing constant had resulted 0.29 units change on the levels of LLPs in opposite direction. The finding of this study confirms the finding of Joseph(2011), Saba *et al.* (2012), Ahmad and Bashir(2013), Hyun and Zhang (2012) and Ali and Eva (2013) that

argues negative effect of lending rate on the LLPs of private commercial banks in Ethiopia. The main reason for this negative association between lending rate and NPLs for Commercial bank in Ethiopia is: First, higher lending rate curtail ability to borrow, which decreases the amount of loan and then reduce NPLs and LLPs. In case, higher lending rate enable individuals with funds to start saving with the banks to earn on their funds but investors with the profitable projects feel unwilling to borrow and invest. Second, increasing the level of lending rate has maximum and minimum limit by itself. That means degree of increase in lending rate and amount of NPLs may not be equal. Rather, ability to repay debt depends on other factors like borrowers' source of income. That is due to mismatch between the time they got return from their investment and the time they repay their debts. In case, when lending rate increases at the time they got return on their investment, the borrowers' ability to repay their debt increase resulting reduction in NPLs. However, it is against the international results from which is concluded that there exists a positive relationship between nonperforming loans and loan interest rate.

According to the researchers, Fofack (2005), Nkusu (2011), Onsarigo, et al., (2013), Louzis et al., (2011) and Jimenez and Saurina (2007), they argue that high increase in interest rate weakens loan payment capacity of the borrower. The above researchers proved that expected sign of interest rate is positive and insignificant to nonperforming loan. Moreover, Angeloni and Fala (2009) examines that reduction in interest rate will lower down the bank's funding cost and hence the creditor have more ability to repay the loan.

4.4 Summary

This chapter discussed the results of documentary analysis regarding the determinant factors of asset quality of private commercial bank in Ethiopia. In case, descriptive statistics, and some diagnostic tests for classical linear regression model assumptions was presented.. From descriptive statistics, the levels of LLPs of commercial banks in Ethiopia are still above the threshold. i.e. more than 5 %. Besides, Commercial banks in Ethiopia earn high return from funds invested by the shareholders rather than from its assets. Furthermore, Capital adequacy ratio is above the minimum requirements on average. And efficiency ratio also high in Ethiopia private commercial banks on during the study period. To this end, normality, heteroscedasticity, multicollinearity and autocorrelation problem was checked. Eventually, the result shows that capital adequacy/solvency ratio, and average lending rate are negative and statistically significant impact on LLPs, whereas efficiency ratio , Loan to deposit ratio are positive and statistically significant impact. GDP and inflation rate are positive and statistically less significant impact on determine the LLPs of private commercial banks in Ethiopia. However, the result did not support the significant effect of bank profitability measured in terms of ROA. In case, the result of this finding is compared with the other researchers finding in the following table 14 the next chapter comes with conclusion and recommendation for this study including the direction for further study.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

The previous chapter presented descriptive analysis of private commercial banks in Ethiopia. The findings obtained from different data sources that regressed by E-view 9 software. The purpose of this chapter is to discuss the conclusions and recommendations based on brief summary of finding. Accordingly, this chapter is organized into three sub-sections, the first section, presents the conclusions of the study, the second section, presents the recommendations that provided based on the findings of the study, and finally section three presents provide research limitations and future research directions .

5.1. Conclusion

The main objective of this study was to investigate bank specific and macroeconomic determinants of asset quality in Ethiopia private commercial banks. To achieve this broad objective, the study used quantitative research approach. The panel data was used for the sample of six private commercial banks in Ethiopia. The data was analyzed by using Fixed Effect Model. For the purpose of analysis, Eview 9 software was used. Data was presented by using descriptive statistics. The model was tested for the classical linear regression model assumptions. The model fulfils assumptions of the CLRM. based on panel data analysis on the time period from 2000 to 2016. Eight factors affecting banks of asset quality were chosen and analyzed. From the list of possible explanatory variables, only seven of them proved to be statistically significant at different level. The results of models enable us to make following conclusions. with respect to the bank specific variables, the study find that from five bank specific variables four of them (capital adequacy ratio, cost efficiency, loan to deposit ratio and return on equity) were statistically significant and important factors that affect the level of LLPs in Ethiopia private commercial banks. From macroeconomic variable the study also find evidence for a significant and positive relationship between GDP and inflation rate also significant and negative relationship between lending rate and loan loss provisions, from mentioned variables efficiency ratio have a very strong impact on LLPs. Result also shows that the impact of efficiency ratio on NPLs is instantaneous. The empirical results, however, reveals that GDP and inflation rate are important

determinants of LLPs, The study found that, the micro economic determinants are the results of fixed effect regression model negative and insignificant effect of return on asset on the level of LLPs of private commercial banks in Ethiopia, for the period under consideration.

However, the study reveals that capital adequacy ratio has negative and statistically significant impact on NPLs of private commercial banks in Ethiopia. This indicates banks with strong capital adequacy have a tendency to absorb possible loan losses and thus, reduce the level of LLPs, due to efficient utilization of its capital. Also bank profitability measured in terms of ROE had negative and statistically significant effect on the levels of LLPs. This implies effective management of commercial banks in Ethiopia on utilization of funds contributed by shareholders. Similarly, the finding of the lending rate is also showed negative and statistically significant impact of LLPs at 10 % significant level. This implies due to other extraneous factors, increase in lending rate reduces the levels of LLPs for private commercial banks in Ethiopia.

5.2. Recommendation

Based on the findings of the regression analysis and conclusion, the following recommendations were forwarded. The findings of the study showed that, capital adequacy ratio, return on equity, efficiency ratio. Loan to deposit ratio, GDP growth rate and inflation rate, are significant drivers of LLPs in Ethiopian private commercial banks during the study period. In order to improve asset quality, specifically loans, it is strongly recommended that bank loan officers and management should always give a serious attention to the health of asset quality of banks specifically loan performance to prevent loans loss. In order to limit the chance of occurrence of loan losses; it is better for the bank managers to give due emphasis on the asset management decision. Once assets are considered as appropriate sources of financing, these assets must be managed efficiently, the researcher recommended as follows

- ✓ All private commercial banks seriously consider all the internal and external factors causing deterioration of asset quality as well as the impact of non-performing loan on the bank's overall performance in order to reduced level of loan loss provisions.
- ✓ Banks should also improve continues credit risk monitoring of their loan portfolios

and loan defaults are estimated accordingly and relevant measures taken to reduce the level of LLPs.

- ✓ Private commercial Banks should apply efficient and effective credit risk management that will ensure that loans are harmonized with ability to repay their debt and to reduced loan losses.
- ✓ Private commercial banks are more careful when providing new loans during economic growth periods, as it was found that an increase in GDP will lead to increase in loan losses among private commercial banks in Ethiopia.
- ✓ Private commercial banks should establish continues credit process which assesses repayment capacity of borrowers, feasibility of projects and experience of the management of borrowing companies particularly during high economic growth period.
- ✓ According to the study results capital adequacy ratio had significant and negative relationship with LLPs, so the researcher recommended that NBE and regulatory body of banks, to ensure that all private commercial banks in Ethiopia operate within high level of capital to control the level of high loan losses provisions in the banking industry.
- ✓ The government as well as other stakeholders in the economy should acknowledge the threat that Loan Loss Provision cause not only to the banking sector but also to the general economy. Furthermore, the government should implement policies that take into account LLPs.

Generally, bank specific factors such as bank return on equity, and efficiency ratio, loan deposit ratio and capital adequacy ratio are dominantly affect the bank asset quality which are easily controlled by bank managements, while external factors like GDP,INF and ALR are less contribution to affect the level of asset quality of Ethiopian private commercial banks. Banks have to be attentive in their lending decisions so as to avoid loan losses and the accumulation of non-performing loans. Banks need to concentrate on sectors that are performing well and avoid lending to those sectors which have already recorded a significant amount of Loan losses. One thing to note is that, this result can be generalized to the whole banking sector in Ethiopia as almost all the banks have been affected by Loan losses. Therefore, the recommendations generated are a prescription for all commercial banks in Ethiopia.

5.3. Direction for Further Studies

This study examined both bank specific and macroeconomic determinants of nonperforming loans of senior private commercial banks in Ethiopia using selected variables. And tried to meet the gap between the existing literatures (that are mentioned in chapter one and two), but it also has its own limitations and those limitations are the study employed only a secondary data (banks audited financial statements),the sample limited only six private commercial banks out of sixteen, Even if there are so many bank specific and macroeconomic variable the researcher only see five bank specific variable (capital adequacy, cost efficiency, return on asset, return on equity, loan to deposit ratio) and three macroeconomic variables (GDP, inflation and average lending rate)

Therefore, the future researches should investigate by increasing the number of samples and by including new determinants of LLP. Like bank specific; bank size, Credit growth etc. from macroeconomic factors such as government policy, real exchange rate, tax rate and unemployment.

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Appendix

Table 1: List of private commercial banks in Ethiopia

No	Name of Banks	Years of Establishment
1	Awash International Bank	1994 G.C
2	Dashen Bank	1995 G.C
3	Bank of Abyssinia	1996 G.C
4	Wegagen Bank	1997 G.C
5	United Bank	1998 G.C
6	Nib International bank	1999 G.C
7	Cooperative Bank of Oromia	2004 G.C.
8	Lion International Bank	2006 G.C.
9	Zemen Bank	2008 G.C.
10	Oromia International Bank	2008 G.C.
11	Buna International Bank	2009 G.C.
12	Berhan International Bank	2009 G.C.
13	Abay Bank S.C	2010 G.C.
14	Addis International Bank S.C	2011 G.C.
15	Dehub Global Bank S.C	2012 G.C.

16	Enat bank	2012 G.C.
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Source: National Bank of Ethiopia

The classification of NBE for the period 2014/15 as per the aforementioned trait is tabulated below.

Table.2 National Bank of Ethiopia Banks Asset Classification

Total Asset	Private Commercial Banks	Classification
Greater than Birr 9 Billion	<ul style="list-style-type: none"> • Awash International Bank S.C • Bank of Abyssinia • Dashen Bank • NIB International Bank S.C • United Bank S.C • Wegagen Bank S.C 	Large Size
Between Birr 3 billion and 9 billion.	<ul style="list-style-type: none"> .Cooperative Bank of Oromia • Oromia International Bank • Zemen Bank • Abay Bank • Buna International Bank • Lion International Bank 	Medium size
Less than Birr 3 billion	<ul style="list-style-type: none"> • Addis International Bank • Berhan International Bank • Debub Global Bank • Enat Bank 	Small size

Table 3 Comparison of Finding on Determinants of Asset quality from Previous Studies

No	Authors	Positive	Negative	Significant effect	insignificant effect
1	Saba <i>et al.</i> (2012)	GDP	ALR	ALR	
		IR		GDP	
				IR	
2	Louzis <i>et al.</i> (2010)	ALR	ROA,ROE,	ROA,ROE,	CAR,LTD
		IR	GDP growth	GDP	
				ALR	
				IR	
3	Swamy (2012)				IR
					GDP,CAR, ALR
4	Makri <i>et al.</i> (2014)	ALR, UE.INF	GDP,ROA, ROE		ROA,LTD,I R,budget deficit
5	Selma and Jouini (2013)		ROA	ROA	
6	Boudriga <i>et al.</i> (2009)		ROA	ROA	
7	Carlos (2012)				IR
8	Klein (2013)	IR	GDP,loan growth rate	GDP,loan growth rate	Un Employment
9	Boudriga <i>et al.</i> (2009)	CAR	ROA	CAR,ROA	
10	Skarica (2013)	IR	GDP,UE	GDP,UE	

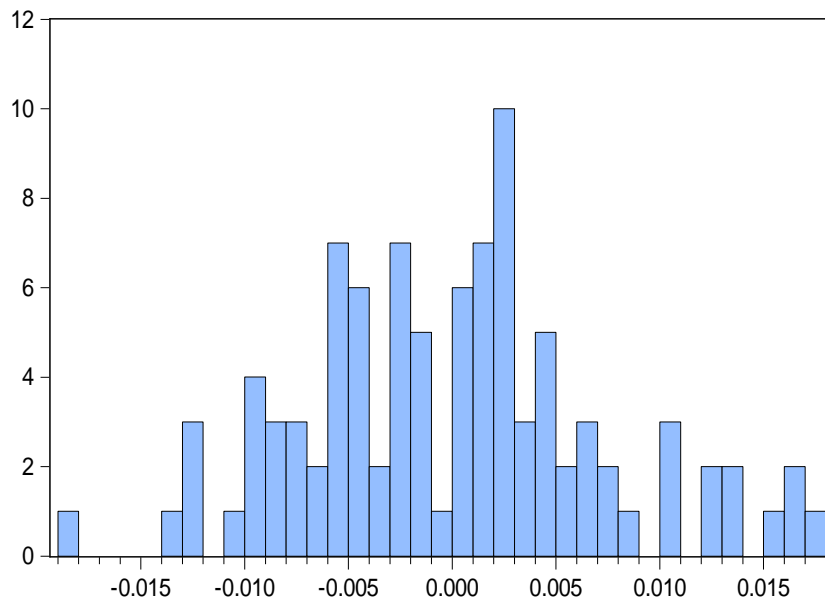
11	Selma and Jouini (2013)	ALR	ROA,GDP	ROA,GDP,A LR	
12	Djiogap and Ngomsi (2012)		CAR	CAR	IR
13	Tomak (2013)	IR		IR	GDP,, IR
14	Ahmed and Bashir (2013)	ROA	LR,GDP	ROA	
15	Sakiru <i>et al.</i> (2011)	ALR		ALR	
16	Swamy (2012)	DR,RO A,		DR,ROA,	GDP,INF,C AR,LR,
17	Hyun and Zhang (2012)		Solvency ratio,ROE, LR		
			GDP,UE		
18	Ali and Iva (2013)	loan growth,E xch,rate	GDP,intere st rate		IR
19	Shingjergji (2013)	Total Loan, Net int.marg	CAR,ROE, Loan to Asset	ROE,Loan to Asset	CAR
20	Mileris (2012)				
21	Farhan <i>et al.</i> (2012)	UE,INF, Exch.rate	GDP	UE,INF, Exch. rate	GDP
22	Ranjan and Chandra (2003)	ALR	LTD	ALR,LTD	

No	Authors	Positive	Negative	Significant effect	insignificant effect
23	Daniel and Wandera (2013)	ALR		ALR	
24	, Joseph (2011)	ALR		ALR	
25	Konfi (2012)				High interest rate,
26	Wondimagegnehu (2012)				interest rate
27	Zelalem T (2013)	ALR	OE, IR,GDP	OE, IR,GDP,ALR	
28	Unisa u (2015)	DR, OE,LTD ,LIR	solvency ratio,GDP,IR	OE,DR, LDR,LIR	solvency ratio GDP, IR
29	Gadise G. (2014)		IR		IR
		LTD,ET R,ROA	ROE,CAR, LR,	ROA,ROE,CAR,LR	

Descriptive Statistics

	NPL	CA	ER	GDP	INF	LIR	LTOD	NPL_1	ROA	ROE
Mean	0.0353	0.1433	1.1380	0.0912	0.1222	0.1153	0.7055	0.0352	0.0261	0.2068
Median	0.0317	0.1366	1.0885	0.1025	0.1035	0.1188	0.6826	0.0322	0.0280	0.2137
Maximum	0.0889	0.2944	2.5015	0.1260	0.3640	0.1275	1.0553	0.0889	0.0486	0.4229
Minimum	0.0000	0.0643	0.3947	-0.0210	-0.1060	0.1050	0.4885	0.0000	0.0020	0.0139
Std. Dev.	0.0170	0.0416	0.4252	0.0391	0.1168	0.0076	0.1430	0.0173	0.0109	0.0783
Sum Sq. Dev.	0.0276	0.1641	17.1794	0.1449	1.2970	0.0055	1.9432	0.0283	0.0112	0.5819
Observations	96.0000	96.0000	96.0000	96.0000	96.0000	96.0000	96.0000	96.0000	96.0000	96.0000

Normality



Series: Standardized Residuals
Sample 2001 2016
Observations 96

Mean -3.98e-19
Median 0.000457
Maximum 0.017090
Minimum -0.018939
Std. Dev. 0.007300
Skewness 0.229679
Kurtosis 2.958344

Jarque-Bera 0.850978
Probability 0.653450

Covariance Analysis: Ordinary
 Date: 08/26/17 Time: 22:58
 Sample (adjusted): 2001 2016
 Included observations: 96 after adjustments
 Balanced sample (listwise missing value deletion)

Correlation										
Probability	NPL	CAR	ER	GDP	INF	LIR	LTOD	NPL_1	ROA	ROE
NPL	1.000									
CAR	-0.409	1.000								
ER	-0.114	0.094	1.000							
GDP	0.001	0.011	0.390	1.000						
INF	0.103	0.062	0.341	0.306	1.000					
LIR	-0.34239	0.304071	0.190065	0.140594	0.197056	1.00				
LTOD	0.052862	0.051698	-0.39437	-0.23739	-0.30265	-0.53	1.00			
NPL_1	0.79133	-0.34513	0.134543	0.25684	0.213445	-0.27	-0.10	1.00		
ROA	-0.1451	0.210728	0.662729	0.469917	0.289158	0.13	-0.13	0.13	1.00	
ROE	-0.05871	-0.34685	0.616982	0.546139	0.225288	-0.17	-0.07	0.26	0.66	1.00

Multicollinearity

	CAR	ER	GDP	INF	LIR	LTOD	ROA	ROE	C	NPL(-1)
CAR	1.000									
ER	0.094	1.000								
GDP	0.011	0.390	1.000							
INF	0.062	0.341	0.306	1.000						
LIR	0.304	0.190	0.141	0.197	1.000					
LTOD	0.052	-0.394	-0.237	0.303	-0.528	1.000				
ROA	0.211	0.663	0.470	0.289	0.134	-0.133	1.000			
ROE	-0.347	0.617	0.546	0.225	-0.171	-0.074	0.661	1.000		
NPL(-1)	-0.345	0.135	0.257	0.213	-0.268	-0.104	0.132	0.259		1.000

Heteroskedasticity Test: ARCH

F-statistic	2.167073	Prob. F(1,88)	0.1446
Obs*R-squared	2.163058	Prob. Chi-Square(1)	0.1414

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 08/26/17 Time: 23:00

Sample (adjusted): 3 102

Included observations: 90 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.05E-05	1.08E-05	4.658717	0
RESID^2(-1)	0.155951	0.105938	1.472098	0.1446
R-squared	0.024034	Mean dependent var		6.00E-05
Adjusted R-squared	0.012943	S.D. dependent var		8.29E-05
S.E. of regression	8.24E-05	Akaike info criterion		-15.94851
Sum squared resid	5.97E-07	Schwarz criterion		-15.89296
Log likelihood	719.6831	Hannan-Quinn criter.		-15.92611
F-statistic	2.167073	Durbin-Watson stat		2.152687
Prob(F-statistic)	0.144562			

Dependent Variable: NPL
 Method: Panel Least Squares
 Date: 08/16/17 Time: 22:39
 Sample (adjusted): 2001 2016
 Periods included: 16
 Cross-sections included: 6
 Total panel (balanced) observations: 96

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	-0.104716	0.048268	-2.169478	0.0330
ER	0.010753	0.003682	2.920127	0.0045
GDP	0.050751	0.030144	1.683602	0.0961
INF	0.015681	0.008109	1.933845	0.0566
LIR	-0.299078	0.151411	-1.975273	0.0516
LTOD	0.017172	0.008494	2.021578	0.0465
ROA	-0.507609	0.347972	-1.458765	0.1485
ROE	-0.08109	0.03691	-2.196984	0.0309
C	0.062466	0.022094	2.8273	0.0059
NPL(-1)	0.606623	0.075936	7.988635	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.816589	Mean dependent var	0.0353
Adjusted R-squared	0.784889	S.D. dependent var	0.0170
S.E. of regression	0.007906	Akaike info criterion	-6.6997
Sum squared resid	0.005063	Schwarz criterion	-6.2991
Log likelihood	336.5878	Hannan-Quinn criter.	-6.5378
F-statistic	25.75939	Durbin-Watson stat	2.0169
Prob(F-statistic)	0.000000		