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Determinants of non- Performing Loans: Evidence from Commercial Banks in Ethiopia

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A Thesis submitted to the department of Accounting & Finance, AAU, in partial fulfillment of the requirement of the Degree of Master of Science in Accounting & Finance

Advisor: Abebaw Kassie (PhD)

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Addis Ababa University

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I, **undersigned** declare that this work or any part thereof has not previously been presented in any form to the University or to any other body whether for the purpose of assessment, publication or for any other purpose. I confirm that the intellectual contents of the work are the result of my own efforts and no other person.

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This is to certify that Yosef Fekadu has carried out his research work on the topic entitled ***"Determinants of Non-Performing Loans: Evidence from Commercial Banks in Ethiopia"***. The work is original in nature and is suitable for submission for the award of the Degree of Master of Science in Accounting & Finance at the Addis Ababa University.

Abebaw Kassie (PhD)

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DECLARATION

This is to certify that the thesis prepared by Yosef Fekadu, entitled ***"Determinants of Non-Performing Loans: Evidence from Commercial Banks in Ethiopia"*** and submitted in partial fulfillment of the requirements for the degree of Master of Science in Accounting & Finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ABBREVIATION AND ACRONYMS

AIB: - Awash International Bank

ARDL: - Autoregressive Distributed Lag

BOA: -Bank of Abyssinia

CAR: -Capital Adequacy Ratio

CBE: -Commercial Bank of Ethiopia

CBO: -Cooperative Bank of Oromia

CESEE: - Central, Eastern and south eastern European

CSA: - Center of Statistical Agency

DB: - Dashen Bank

ECB: -Ethiopian commercial bank

EXR: - Exchange rate

GDP: - Gross Domestic Product

GMM: - Generalized Methods of Moments

IMF: - International Monetary Fund

INFR: - Inflation Rate

LTD: Loan to deposit

MENA: - Middle East and North Africa

NBE: - National Bank of Ethiopia

NIB: - Nib International Bank

NPL: -Nonperforming Loan

OLS: - Ordinary Least square

ROA: -Returns on Asset

ROE: -Return on Equity

UB: - United Bank

US: - United States

WB: - Wegagen Bank

ZB: -Zemen bank

ABSTRACT

The study adopted a quantitative research approach and used data collected from the National Bank of Ethiopia, Central Statistical Agency and financial statement of nine commercial banks from 2006-2017. Descriptive and random effect multiple regression analysis are employed to analyze the unbalanced panel data. Findings of the study show that return on equity and capital adequacy have negative and significant impact on NPLs. Whereas, loan loss provision and loan to deposit have positive significant relationship with NPLs. The study also showed that GDP, NIM and UM are statistically insignificant factors of NPLs. The finding of this study is important since once identifying the determinants of NPLs might enable management body to make appropriate lending policies that prevent the occurrence of NPLs. The study recommended bank managers to better emphasize on the management of current assets specially loans. Furthermore, it is preferable for commercial banks to concentrate or diversify their credit portfolio by calculating risk relative to its return in order to increase return on equity and to

reduce the level of nonperforming loans.

Key words: *Nonperforming loans, bank specific factors, macroeconomic factors*

CHAPTER ONE

INTRODUCTION

This chapter being the precedent outlines defines and addresses the basic idea of the research. It gives a brief background of the study followed by statement of the problem and introduces the thrust of the research by identifying its main areas. The chapter also presents research question, objectives & hypothesis, significance & scope of the study and organization of the research report. In short it is the foundation upon which the rest of the research is lay on and guides the researcher through the research process.

1.1 Background of the study

Commercial banks are the most relevant financial institution in many countries which encourage and mobilize savings and also channel such savings into productive investment. The reason is because of their high network of offices; and secondly because the banks are strong and thus attract savers. Commercial banks also accept deposits from customers and lend to borrowers for various purposes; this role paramount and outweighs every other one. They serve as intermediaries between borrower and savers. In the process of lending, new money is created by banks through the deposit lending multiplier effect. Based on this, commercial banks are able to influence the level of money stock, the allocation of fund, the direction and use of resources in the economy.

Obviously, credit extending is the main income generating activity of banks (Kargi, 2011). Loans are the dominant asset and represent 50-75 percent of the total amount at most banks, generate the largest share of operating income and represent the banks greater risk exposure (Mac Donald and Koch, 2006). However, it exposes the banks to credit risk. The Basel Committee on Banking Supervision (2001) defined credit risk as the possibility of losing the outstanding loan partially or totally, due to credit events (default risk). Credit risk is an internal determinant of bank performance. The higher the exposure of a bank to credit risk, the higher the tendency of the bank to experience financial crisis and vice-versa. The negative effect of credit risk and non-performing loans on banks performance and the economy in general has made the issue of NPLs a global one and of great importance in the last decades. According to Hou and Dickinson (2007), many researches on the causes of bank failures found that asset quality is a statistically

significant predictor of insolvency, and that failing bank institutions always have high level of Non-performing loans prior to failure.

According to the International Monetary Fund (IMF, 2009), a non- performing loan is any loan in which interest and principal payments are more than 90 days overdue; or more than 90 days' worth of interest has been refinanced. In the Ethiopian banking business directive, non-performing loans are defined as "Loans or Advances whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with the contractual repayment terms of the loan or advances in question" National Bank of Ethiopia (NBE ,2008). Non-Performing loans arises from the extension of credit facilities to customers (Inekwe, 2010). This exposes banks constantly to credit risk due to the possibility that the borrower will default. Nonperforming loans (NPLs) are when payments of interest or principal are past due by 90 days or more or interest payments equal to 90 days or more have been capitalized, refinanced, or delayed by agreement or payments are less than 90 days overdue because of some reasons such as a debtor filing for bankruptcy to doubt that payments will be made in full (Adriaan, 2015). NPLs generally refer to loans which for a relatively long period of time do not generate income. This implies that the principal and interest on these loans have been left unpaid for at least 90 days (Caprio and Klin-gebiel, 1999).

NPL are likely to hamper economic growth and reduce the economic efficiency (Hou, 2007). According to Fofack (2005) most banks in Sub-Sahara African countries were preceded by a rapid accumulation of NPLs during the 1990s crisis. Financial performance of any commercial bank is measured in terms of profitability and NPLs (Balasubramaniam, 2013). A sound financial system requires minimum level of NPLs which in turn facilitates the economic development of one country.

The leading causes of non-performing loans, regardless of the implications of NPLs on smooth functioning of banks for anticipating banking and financial crises, remain unknown for most countries especially in Sub-Saharan Africa (Fofack, 2005). The causes for loan default vary in different countries and have a multidimensional aspect both, in developing and developed nations. Theoretically there are so many reasons as to why loans fail to perform. Some of these include depressed economic conditions, high real interest rate, inflation, lenient terms of credit,

credit orientation, high credit growth and risk appetite, and poor monitoring among others. Bercoff et al. (2002) categorizes causes of nonperforming loans to Bank specific and Macroeconomic conditions.

Several empirical studies have been conducted on factors that affect banks non-performing loan by using bank specific and macroeconomic factors jointly and separately. For instance, the study of Calice (2012) for the Tunisian banking sectors found as banking sector suffer from decline in asset quality. The study of Skarica (2013) on the determinants of NPLs in Central and Eastern European countries through fixed effect model was also found as GDP growth rate, unemployment rate and inflation had negative and significant impact on NPLs. Similarly, Carlos (2012) based on OLS model estimators found as NPLs have negative association with GDP growth rate whereas a positive association with unemployment rate. Moti *et al.* (2012), made study on the effectiveness of credit management system on loan performance and found as credit quality, interest rates charged, credit risk control and collection policies had an effect on loan performance in Kenya. In addition, Blanco and Gimeno (2010) for South African banks and Kolapo (2012) for the Nigerian banks, NPLs have an adverse effect on banking sectors survival. Louzis *et al.* (2010) examined the determinants of NPLs in the Greek financial sector using dynamic panel data model and found as real GDP growth rate, ROA and ROE had negative whereas lending, unemployment and inflation rate had positive significant while loan to deposit ratio and capital adequacy ratio had insignificant effect on NPLs. Besides, Saba *et al.* (2012) made study on the determinants of NPLs on US Banking sector and found as lending rate had negative while inflation and Real GDP per capital had positive and significant effect on NPLs. Podpiera and Weill (2008) examined empirically the relationship between cost efficiency and non-performing loans in the context of the Czech banking industry for the period 1994 to 2005. The study focused only on macroeconomic factors of loan defaults through panel regressions and panel vector autoregressive models and suggested that sharp increase in interest rates result in deterioration of borrower's repayment capacity and hence, cause of increase in non-performing loans (Nkusu, 2011).

In Ethiopia limited studies such as Negera (2012); Anisa (2015); Gezu (2014); Tesfaye (2015); Mesay (2017); and Meshesha (2015) assessed the determinants of NPLs of commercial banks.

But most of them did not observe the macroeconomic factors and used only descriptive statistics and correlation matrix for the analysis.

1.2 Ethiopian loan classification and provision

As per NBE (2012 p.3) NPLs are defined as "loans or advances whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with the contractual repayment terms of the loan or advances in question".Substandard, doubtful and Loss indicative the availability of nonperforming loan respectively due to the degree of collection or repayment enter in to doubt and difficulty. According to NBE (2012) Ethiopian commercial banks classify their loans as pass, special mention, substandard, doubtful and loss.

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

Special mention: Short term loans past due for 30 days or more, but less than 90 days and medium and long term loans past due for 6 month or more, but less than 12 months.

Substandard: Short term loan past due for 90 days or more, but less than 180 days and medium and long term loans past due for12 months or more, but less than 18 months

Doubtful: Short term loan past due for 180 days or more, but less than 360 days and medium and long term loans past due for18 months or more but less than 3 years.

Loss: Short term loan past due for 360 days or more, and medium and long term loans past due for 3 years or more.

Provisioning requirements for loans: NBE requires all Ethiopian commercial banks holding provisions for each loan to absorb the potential losses in their loans portfolio which shall be created by charges to provision expense in the income statement and shall be maintained at a level adequate to absorb potential losses in the loans or advances portfolio. The provisions for loan losses account always have a credit balance. Additions to or reductions of the provisions for

loan losses account should be made only through charges to provisions in the income statement at least every calendar quarter. Banks are required to maintain the following minimum provision percentages against the total outstanding principal balance of each loan or advance classified. As per the (NBE, 2012) the provision for impairment losses are determined as (Table 1.1.)

No.	Loan Category	Provision required
1	Pass loans	1%
2	Special mention loans	3%
3	Substandard loans	20%
4	Doubtful loans	50%
5	Loss loans	100%

Source: *NBE Directive no SBB/52/2012*

1.3. Non-Performing Loans and Bank Performance

Over the recent past, a strong association has been established between NPLs and banking crises. According to Khemraj (2005) in Chikoko, Mutambanadzo, and Vhimisai (2012), banking crises in East Asia and Sub- Saharan African countries were preceded by high NPLs. Ahmad (2002) reported of the existence of a significant relationship between credit risk and financial crises (Joseph, 2012). The conclusion from the study was that a credit risk preceded the 1997 Asian financial crisis, and worsened as NPLs increased (Joseph, 2012). Khemraj and Pasha (2012) explain that high percentages NPLs are often associated with performance problems of banks and financial crises in both developing and developed countries. Fofack (2005) associates the occurrence of banking crises with a massive accumulation of NPLs and further observes that the NPLs account for a significant portion of total assets of insolvent banks and financial institutions.

NPLs are important because they affect the financial intermediation role of commercial banks which constitutes the banks' main source of income, and ultimately, the financial stability of an economy (Klein, 2013). For this reason, NPLs have increasingly attracted attention recognising that a consequence of large amount of NPLs in the banking system is bank failure as well as a

symptom of economic slowdown (Lata, 2014). This is largely because the financial performance of any commercial bank is measured in terms of profitability and NPLs have a direct adverse impact on the bottom line due to the provisions which the banks are forced to make on account of the NPLs (Balasubramaniam, 2013).

1.4 Statement of the problem

NBE imposed restriction on the proportion of NPLs not to be exceed 5% of their total loan outstanding (NBE 2012). After the restriction the NPLs of ECBs have shown improvement. However, according to Mehari (2012) reduction of NPLs in ECBs is not resulted from improved credit risk controlling, measuring and monitoring system. Rather, by writing off and restructuring of loans. For instance, (NBE, 2016) announced that coffee trader loan faced repayment problem and order ECBs to reschedule their loan. Evident to this Dashen bank faced repayment problems totaling Birr 446,658,898 rescheduled the payment at 30 June, 2016.Both writing off and restructuring of NPLs is a post active measurement (Zelalem, 2013). The issue of preventing NPLs in ECBs is still in question. Banks are not fulfilling the maximum (5%) allowable limit of NPLs. For instance, in 2013 and 2014 NPLs of Zemen Bank was 8.52% and 8.83% respectively (ZB 2014). Additionally, in 2010 NPLs of Co-operative Bank of Oromia and Nib International Bank was 14.58% and 7.37% of their total loans respectively. The amount of NPLs fluctuates year to year for example in 2014, 2015 and 2016 NPLs of CBE was 1.4%, 1.8% & 2.5% respectively (CBE 2016). Furthermore, according to Messay (2017), as indicated in the table under appendix VIII, the proportion of NPLs of most commercial banks exceeded 5% of their total loan outstanding.

In addition, literatures indicate NPLs are influenced by macroeconomic and bank specific factors. However, the impact of the variables differs depending on economic condition, political stability, loan policy etc. Most of the studies are conducted in developed banking industry. As to knowledge of the researcher, limited number of literatures in Ethiopian banking industry has been conducted. For instance, Negera (2012), Meshesha (2015), and Tesfaye (2015) assessed the determinants of NPLs in Ethiopian commercial banks and considered only bank-specific variables in their study. However, macroeconomic variables could have been included and analyzed , the effects could be appropriate since similar studies has demonstrated these variables

have significant effect on NPLs. Dula (2010) concentrated on managing of NPL and the study used only one private bank, does not consider other private and state banks who have large amount of market share. Mesay (2017) assessed the determinants of non-performing loan growth rate with emphasis on manufacturing sector and considered macroeconomic variables (deposit Interest rate, exchange rate and annual inflation rate), bank specific (loan to deposit ratio, credit monitoring and follow-up and loan growth rate) and business characteristic (business profit margin and nature of business). Anisa (2015) studied the determinants of non-performing loans of commercial banks in Ethiopia. The included variables were macroeconomic (deposit rates, GDP growth rate, lending interest rate, and inflation rate) and bank specific (cost efficiency, solvency ratio, and loans to deposit ratio). Aemiro and Rafisa (2014) examined the bank specific determinants of credit risk in Ethiopian commercial banks. Zelalem (2013) examined the bank-specific and macro-economic determinants of Non- performing loans (NPLs) of commercial banks in Ethiopia. The macroeconomic factors considered were effective exchange rate, inflation rate, gross domestic product, and lending rate; bank specific variables were loan growth, bank size, state ownership, financial performance, operational efficiency, and income diversification. Ayalew (2009) observed the legal problems in realizing NPLs of Ethiopian banking sector.

Most of these studies used descriptive analysis and correlations matrix for the analysis. These methods only provide simple summaries about the sample and doesn't indicate the strength of the relationship between dependent and independent variables. In addition, several studies conducted in different countries, indicate that a number of macroeconomic and bank specific variables explained the level of NPL. In this respect, as knowledge of the researcher, few of these determinant variables are considered in similar studies conducted so far. The findings of the different studies conducted on the determinant of NPL are inconsistent each other depend on the economic condition, the credit policy and the general situation in which the banks operate. Ethiopian commercial banks have their own unique nature such as high dominance of state bank, infancy of banking industry, restriction of foreign bank and unavailability of capital markets.

Therefore, this study will incorporate some of the significant determinants of NPL like Net interest margin, Capital adequacy ratio and Unemployment rate that are not considered in Ethiopian context. Generally, the study is expected to fill the existing literature gap in the area of

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

1.5 Objectives

The broad objective of the study is to investigate the factors affecting non-performing loans of commercial banks in Ethiopia.

1.6. Hypotheses

Based on this broad objective the following hypotheses (H) were developed.

H1. Loan to deposit ratio has a significant positive relationship with Nonperforming loans of Ethiopian commercial banks.

H2.Net interest margin has a significant positive relationship with Nonperforming loans of Ethiopian commercial banks.

H3. Capital adequacy ratio has significant negative relation with Nonperforming loans of Ethiopian commercial banks.

H4. Return on equity has a significant negative relationship with Nonperforming loans of Ethiopian commercial banks.

H5. Loan loss provision has a significant positive relation with Nonperforming loans of Ethiopian commercial banks.

H6. Gross domestic product has significant negative relationship with Nonperforming loans of Ethiopian commercial banks.

H7. Unemployment rate has significant positive relationship with Nonperforming loans of Ethiopian commercial banks.

H8. Exchange rate has significant positive relationship with Nonperforming loans of Ethiopian commercial banks.

H9. Lending rate has significant positive relationship with Nonperforming loans of Ethiopian

commercial banks.

H10. Inflation rate has significant positive relationship with Nonperforming loans of Ethiopian commercial banks.

1.7 Significance of the study

This study thus would help Ethiopian commercial banks get insight on the factors that affect the non-performing loans to develop effective management strategies to increase their performance and to reduce nonperforming loan simultaneously and the NBE to examine its policy in banking supervision pertaining to ensuring asset quality banks maintain. In addition, the study would also contribute to the existing body of knowledge regarding the determinants of nonperforming loans and motivate further research on Ethiopian Banking context.

1.8 Scope of the study

The objective of study is to examine the determinants of NPL of commercial banks in Ethiopia. The study will employ twelve years unbalanced panel data from 2006-2017 and selected the following nine Ethiopian commercial banks; Commercial Bank of Ethiopia, Dashn Bank, Zemen Bank, Wegagen Bank, Awash International Bank, Bank of Abyssinia, Cooperative Bank of Oromia, United Bank and Nib International Bank. The samples are selected based on registration period and credit disbursement share of Commercial banks. Banks registered before 2010 at national bank of Ethiopia and their credit share above 2%.

1.9 Limitation of the Study

The study considered only commercial banks that have started operation before 2006 in Ethiopia. It is conducted on nine Commercial Banks of Ethiopia selected purposively whose credit share is above 2%. The study couldn't take in to account all commercial banks operating in Ethiopia. Besides; owing to the nature of the subject area, i.e.; excessive confidentiality on data of NPL, it was not easy to get all relevant information from target areas

1.10. Organization of the research report

This study is organized in five chapters. The second chapter provides the literature review which constitutes theoretical and empirical research. The third chapter which is about methodology of the research presents the research design employed, the sampling method, data collection methods, and the data analysis technique. The fourth chapter presents analysis results and findings of the study. Lastly, the fifth chapter presents summery of the study, concludes the investigation, forward recommendations and suggests areas for future research.

CHAPTER TWO

LITERATURE REVIEW

This chapter presents the literature review on Nonperforming loans and their determinants. The chapter is organized in to six sections. Section 2.1 presents the theoretical review related to NPLs, section 2.2 reviews the empirical evidence on determinant factors of NPLs, section 2.3. presents the empirical literature, section 2.4 presents related empirical studies in Ethiopia, section 2.5 presents conclusion and knowledge gap lastly; section 2.6 presents the conceptual frame work of the research.

2.1. Theoretical review

According to (NBE 2008), Article (4.6) loans and advances are defined as,

> *"any financial assets of a bank arising from a direct or indirect advance (i.e. unplanned overdrafts, participation in a loan syndication, the purchase of loan from another lender etc.) or commitment to advance funds by a bank to a person that are conditioned on the obligation of the person to repay the funds, either on a specified date or on demand, usually with interest. The term includes a contractual obligation of a bank to advance by the bank on behalf of a person. The term does not include accrued but uncollected interest or discounted interest."*

A loan or credit facility refers to a contractual promise between two parties where one party, the creditor agrees to provide a sum of money to a debtor, who promises to return the amount to the creditor depend on agreement period of time.

According to Onyiriuba (2009) a loan is money that a bank lets a borrower to have the use of as a credit facility on condition that they pay it back with interest to the bank at an agreed future date. According to Onyeagocha (2001), the term credit is used specifically to refer to the faith placed by a creditor (lender) in a debtor (borrower) by extending a loan usually in the form of money, goods or securities to debtors. Loans are the basic asset that generate the largest share of operating income and represent 50-75 percent from total amount of assets at most banks. On the opposite direction, loan if not managed properly it represents the banks greater risk exposure (Mac Donald and Koch, 2006). According to Wei-shong et al. (2006) the administration of loan portfolios seriously affects the profitability of banks since the major portion of gross profit of the banking industry is earned from loans.

Due to the nature of their business, commercial banks exposed themselves to the risks of default from borrowers and NPLs are closely associated with banking crises (Waweru and Kalami, 2009). Heffernan (2005) stated that the failure of the commercial banks' clients to repay their obligations caused the emergence of NPLs and is considered the most serious financial problems facing commercial banks. Non-Performing loans arises from the extension of credit facilities to customers (Inekwe, 2010). This exposes banks constantly to credit risk due to the possibility that the borrower will default. The failure of the commercial banks' clients to repay their obligations

caused the emergence of NPLs and is considered the most serious financial problems to commercial banks (Shelagh, 2005).

The concept of non-performing loans has been defined in different literatures. Some use quantitative criteria like number of day overdue scheduled payments while other countries rely on qualitative norms like information about the customer's financial status and management judgment about future payments (Bloem and Gorter, 2001). IMF (2009) defined a non-performing loan as any loan in which interest and principal payments are more than 90 days overdue or more than 90 days' worth of interest has been refinanced. Non- performing loans are defined as defaulted loans which banks are unable to generate profit. Hou and Dickinson (2007) and Alton and Hazen (2001) defined NPLs as a loan that is not earning income and: Full payment of principal and interest is no longer anticipated, Principal or interest is 90 days or more delinquent, or The maturity date has passed and payment in full has not been made. Similarly, Asari (2011) defined Non-performing loan as defaulted loan in which banks are unable to profit from them. Patersson and Isac (2004) defined NPLs as loans or advances whose credit quality has declined such that full collection of principal and/or interest in reference to contractual repayment conditions of the loan or advances is due and uncollected for 90 (ninety) consecutive days or more away from the scheduled payment date or maturity. NPLs are loans or advances whose credit quality has deteriorated such that full collection of principal and/or interest in accordance with the contractual repayment terms of the loan or advances in question (NBE, 2012).

According to Fofac (2009) the economic and financial costs of non-performing loans are significant. Potentially, these loans may negatively affect the level of private investment, increase deposit liabilities and constrain the scope of bank credit to the private sector through a reduction of banks' capital, following falling saving rates as a result of runs on banks, accumulation of losses and correlative increased provisions to compensate for these losses. These loans also have potential for reducing private consumption, and in the absence of deposit guarantee mechanisms to protect small depositors, can be a source of economic contraction, especially when coupled with declining gross capital formation in the context of a credit crunch caused by erosion of banks' equity and assets.

Predominant theories of non-performing loans focus on different causes. These include asymmetric information, risk premium, moral hazard, agent problem, adverse selection and patronizing effect.

Asymmetry Theory: The theory of asymmetric information state that it may be difficult to differentiate between good and bad borrowers. The problem of asymmetric information arise a result of incomplete information possessed by the lender and to a certain extend complete information being possessed by the borrower about the transaction (Richard, 2011). Accordingly, the lender might make a right or wrong decision about the transaction. In this regard, Hafer (2005) noted that, increasing the interest rate and required additional collateral lead the low risky clients to go elsewhere in order to obtain loans, while the high risky clients will accept the conditions at hand. In other word, those who want to take on big risks are likely to be the most eager to take out a loan, even at a high rate of interest, because they are less concerned with paying the loan back. This may result into adverse selection and moral hazards problems as it is well known in microeconomic theory. According to Arestis and Sawyer (2006) adverse selection problem occurs before the transaction takes place in the event that the lender's unable to know the real personality of the borrower. In this respect, adverse selection and moral hazards have led to significant accumulation of Nonperforming loan in banks (Bester, 1999).

Risk Premium theory: Financial decisions incur different degrees of risk. The "perceived credit risk" depends on a person's judgment. Risk and expected return move in tandem when the expected return increases also the risk increase. According to Ewert et al. (2000) the lender takes high risk to generate more return. This interest exposed for corresponding risk, it means that borrowers fail to pay their obligation when the interest rate is high.

Moral hazard theory: The "moral hazard" hypothesis was first discussed by Keeton and Morris (1987), who argued that banks with relatively low capital respond to moral hazard incentives by increasing the riskiness of their loan portfolio, which in turn results in higher non-performing loans on average in the future. Moral hazard arises as a result of changes in the two parties' incentive after entering into a contract such that the riskiness of the contract is altered (Chengeta, 2007). Louzis, Vouldis and Metaxas (2011) also state that the moral hazard of too-big-to-fail banks represents another channel relating bank-specific features with non- performing loans. Furthermore, a policy concern is that too-big-to-fail banks may opt for undertaking even excessive risk since market discipline is not imposed by its creditors who expect government

protection in case of a bank's failure. Consequently, large banks may compromise and increase their leverage unnecessarily and in turn offer loans to lower quality borrowers.

Agency problem: There is a principal and agent relationship between shareholders and managers. Shareholders are the principals and managers are their agents. In theory managers should act in the best interests of shareholders, actions and decisions should lead to shareholders' wealth maximization but in practice on the reverse. This problem arises from managers give priority for self-interest, public perception and short term earning due to this take high risk. Conflict of interest between bank managers and shareholders may aggravate the adverse selection (Breuer, 2006). According to Monaich (2013) possible mismatch of interest between shareholders and management holds due to asymmetries in earning distribution, which can result in the management taking too much risk.

Patronizing effect theory: This model proposes that there is a possibility that lenders are unwilling to collect. Unwillingness may arise from several factors such as poor policies, procedures, structure, and rewards physical setting Shinaj and Mansur (2015). According to Islam et al. (2005) such internal problems led to accumulation of Nonperforming loans as they weaken management and motivate borrowers not to repay the loan, because they are confident that no serious action will be taken against them.

2.2. Determinant of nonperforming loan

Researchers set different determinant factors for NPLs depending on multidimensional aspects like economy and countries situation and give more emphasized for two grand factor bank specific and macroeconomic factors. Macroeconomic factors on external events such as the overall macroeconomic conditions which are likely to affect the borrowers' capacity to repay their loans while the Bank specific internal factor which attributes for the level of non-performing loans.

2.2.1. Bank specific determinants

Bank specific 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 prevents them through using suitable method, determination and elimination of weakness and improvement of process. Bercoff et al., (2002) argue that non-performing loans are

affected by both bank specific factors and macroeconomic factors. Salas and Saurina (2002) reveal that real growth in GDP, rapid credit expansion, bank size, capital ratio and market power explain variation in non- performing loans. In addition, Jimenez and Saurina (2005) provided evidence that non-performing loans are determined by GDP growth, high real interest rates and lenient credit terms. Rajan and Dhal (2003) reported that favorable macroeconomic conditions and financial factors such as maturity, cost and terms of credit, banks size, and credit orientation impact significantly on the non-performing loans of commercial banks in India.

The Several bank specific factor, among others, which the literature proposes as important determinants of NPLs are net interest margin, capital adequacy, loan loss provision, loan to deposit ratio and return on equity (Rahman, 2017; Boudiga, 2009; Sales and Saurina, 2002; Messai and Jouini, 2013; Warue, 2013; and Makri, Tsagkanos and Bellas, 2014).

Loan to Deposit Ratio: The loan to deposit ratio is affected by the operational strategy of a bank's management. Klein (2013) loan growth rate have negative significant effect on the occurrences of NPLs. Excessive rapid loan growth declined bank's capital levels and useful pointers the deterioration of banks financial health and can be employed as early warning indicators of future problem loans (Das and Ghosh, 2007). As disclosed by Jimenez and Saurian (2006) loan growth is considered as one of the most important causes of problem loans. However, according to Sinkey and Greenwalt (1991) a rapid expansion of loan may not be a problem by itself, but such expansion leads to poor screening and lending to borrowers of inferior quality.

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

Capital adequacy: is an indicator of the ability of banks to provide funds for expansion and

accepting risk loss caused by the operations of the bank. The difference between total assets and total liabilities is called capital. It is the amount of own fund available to support the bank's business and act as a buffer in case of adverse situation. It shows ability of the firm that liability could be privileged. Capital adequacy is the level of capital required by the banks to enable them withstand the risks such as credit, market and operational risks they are exposed to in order to absorb the potential loses and protect the bank's debtors. Capital adequacy is a measure of the overall financial strength of a bank. The higher the capital adequacy ratio, the higher the level of protection available to depositors and It is vital for maintaining soundness of the banking system since it acts as a cushion against panic or bank run or uncertainties (Keovongvichith, 2012). Djiogap and Ngomsi (2012) 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.

Return on equity: is the amount of net income returned as a percentage of equity Godlewski (2004) used return on assets (ROA) as a performance indicator. He shows that the impact of banks' profitability is negative on the level of NPL ratio. Return on equity measure Profitability and offers clues about the ability of the bank to undertake risks and expand its activity. Banks return on equity increases reflect the risk taking behavior of bank managements and less stressed for revenue creation and less forced to engage risk credit offering business (Makri *et al*., 2014). Messai and Jouini (2013) found that non- performing loans vary negatively with the profitability of banks' assets and positively with the loan loss reserves to total loans. However, Garciya-Marco and Robles-Fernandez (2008) indicate that high levels of return on equity (ROE) are followed by a greater future risk as the policy of profit maximization is accompanied by high levels of risk.

Loan loss provisions: Banks that anticipate high levels of capital losses may create higher provisions to reduce earnings volatility and to strengthen their medium-term solvency. According to Hasan and Wall (2004) where provisions are triggered by default incidents on loans, higher levels of NPLs are associated with high rates of pro-visioning. Managers can also use loss provisions to indicate the financial strength of their banks (Ahmad et al. 1999). The

loans losses reserves are regarded as a controlling mechanism over expected loan losses. Hasan and Wall (2004) found that higher levels of non- performing loans are associated with high levels of loan loss provision. Messai and Jouini (2013) found that non- performing loans vary positively with the loan loss provisions to total loans. Boudriga et al. (2009) studied the determinants factors of NPL and the impact of environmental supervision. The study found that a higher provision appears to reduce the level of non-performing loans. Selma and Jouini (2013) found that there is a positive relationships of the loan loss reserves to total loans with NPLs. Similarly, Ahmed, Takeda and Shawn (2013) in their study found that loan loss provision has a significant positive influence on non-performing loans. Therefore, an increase in loan loss provision indicates an increase in credit risk and deterioration in the quality of loans consequently affecting bank performance adversely.

2.2.2. Macroeconomic factors

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

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

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

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

Un-employment rate: is a phenomenon that occurs when a person who is actively searching for employment is unable to find work. An increase in the unemployment rate could influence negatively the cash flow streams of households and increase the debt burden. Skarica (2013) revealed that 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. With regards to firms, increases in unemployment may signal a decrease production as a consequence of a drop in effective demand. This may lead to a decrease in revenues and a fragile debt condition. This is based on the argument that an increase in the unemployment rate in the country negatively affects the incomes of the individuals which increases their debt burden (Bofondi and Ropele, 2011; Vogiazes and Nikolaidu, 2011).

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

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

2.3. Empirical Literature

Several empirical studies have found a negative association between NPL and real GDP growth (Salas and Saurina 2002; Fofack, 2005; Jimenez and Saurina, 2006; Khemraj and Pasha, 2009; Dash and Kabra, 2010). The higher positive level of real GDP growth habitually entails a higher level of income. This improves the capacity of the borrower to pay its debts and contributes to reduce bad debts. When there is a downturn in the level of bad debts will increase. Hence, the macroeconomic environment has an impact on the assessment borrowers and their ability to have a loan. An economy in growth is favorable to an increase in revenues and a decrease in financial distress. As a result, real GDP growth and employment are negatively associated with the NPL. Conversely, unemployment is positively related to the NPL.

Among the authors, who have confirmed that adverse macroeconomic developments are associated with the increase in NPL, we can cite the example of research conducted by Nkusu (2011). He conducted a study on NPLs and macroeconomic performance on a sample of 26 advanced countries from 1998 to 2009. The study investigated the macroeconomic determinants of NPL in panel regressions and confirms that adverse macroeconomic developments are associated with rising NPLs. The feedback between NPLs and its macroeconomic determinants is investigated in a panel vector autoregressive (PVAR) model. The findings of the study suggested that, deterioration in the macroeconomic environment such as adverse shock to GDP growth, higher inflation, unemployment or falling asset prices is associated with debt service problems, reflected into rising NPL.

Warue (2013) investigated the relationship between NPLs and bank-specific and macroeconomic factors, and establish the extent to which these factors affect the occurrence of non-performing loans in commercial banks in Kenya. The macroeconomic factors included; real GDP, GDP per

capita, lending interest rates, inflation, government expenditure, export and imports, exchange rate between the Kenya shilling and US dollar and asset value as measured by the Nairobi Securities Exchange (NSE) 20 share Index. Bank specific factors included; credit risk management techniques, bank structures, and quality management factors. The study covers the period 1995 to 2009 utilising both secondary and primary data. Particularly, a census of 44 commercial banks in Kenya was taken. A causal- comparative research design based on bank structures was adopted. The study used panel econometrics approach employing both pooled (unbalanced) panel and fixed effect panel models. The study found evidence that return on assets (ROA) was negative and significantly related to NPLs

Makri, Tsagkanos and Bellas (2014) study examined the factors affecting the non- performing loans rate (NPL) of Eurozone's banking systems for the period 2000-2008. A dynamic panel regression method for our analysis specifically, a Generalized Method of the Moments (GMM difference) technique was applied. The variables used include both macro- variables (e.g. annual percentage growth rate of gross domestic product, public debt as percent of gross domestic product, unemployment) and micro-variables (e.g. loans to deposits ratio, return on assets and return on equity). The findings reveal strong correlations between NPL and bank-specific (capital adequacy ratio, rate of non-performing loans of the previous year and return on equity) factors.

Arpa et al. (2001) assess the effects of macroeconomic developments on risk provisions (calculated as the ratio of total provisions for loans to the sum of total loans and total provisions for loans) of Austrian banks for the period 1990–1999 by the use of a single-equation time series model indicating that, risk provisions rise when real gross domestic product growth declines, real interest rates fall and real estate prices increase. Shu (2002) used a single-equation time series model to examine the impact of macroeconomic developments on loans quality in Honk Hong for the period 1995–2002. The results show that the ratio of bad loans to performing loans falls with higher real gross domestic product growth, higher consumer price inflation rate and higher property prices growth, whereas it rises with increases in nominal interest rates.

Using a pseudo panel-based model for several Sub-Saharan African countries, Fofack (2005) finds evidence that economic growth, real exchange rate appreciation, the real interest rate, net

interest margins, and inter-bank loans are significant determinants of NPLs in these countries. The author attributes the strong association between the macroeconomic factors and non-performing loans to the undiversified nature of some African economies.

Shingjergji (2013) studied the impact of bank specific factors on non–performing loans (NPLs) in the Albanian banking system using a simple regression model for data analysis. The study found that capital adequacy ratio had negative but insignificant association with non-performing loans, while return on equity and loans to asset ratio had negative but significant effect on NPLs, Their study also found that total loan and net interest margin had positive significant relationship with non-performing loans (NPLs).

Lawrence (1995) examines such a model and introduces explicitly the probability of default. The model implies that borrowers with low incomes have higher rates of default. This is explained by their increased risk of facing unemployment and being unable to pay. Additionally, in equilibrium, banks charge higher interest rates to riskier clients.

Keeton (1999) who used data from commercial banks in the United States (from 1982 to 1996) and a vector auto regression model indicate this association between loan and rapid credit growth. Sinkey and Greenwalt (1991) who have also studied large commercial banks in the US and found out that excessive lending explain loan –loss rate. Salas and Saurina (2002) who studied Spanish banks found out that credit growth is associated with non-performing loans. Besides, study by Bercoff, Giovanni and Grimard (2002) shows that asset growth explains NPLs.

Mohammad, Ammara, Abrar and Fareeha (2012) examined economic determinants of non-performing loans using correlation and regression analysis to analyze the impact of selected independent variables and the result reveals that interest rate, energy crisis, unemployment, inflation and exchange rate has a significant positive relationship with the non-performing loans of Pakistan banking sector, while GDP growth rate has a significant negative relationship with the non-performing loans of Pakistan banking sector. Bofondi and Ropele (2011) investigated the macroeconomic determinants of bad loans of Italian banks for the period 1990-2010 using quarterly data and found that non-performing loans are positively associated with the unemployment rates, lending rates and negatively associated with the GDP growth rate.

Similarly, Ekanayake and Azeez (2015) investigated the determinants of non-performing loans in licensed commercial banks in Sri Lanka for the period 1999- 2012 and found that the level of non-performing loans can be attributed to both macro-economic conditions and banks specific factors. Their study results reveal that non- performing loans tends to increase with deteriorating banks efficiency and there was a positive correlation between loan to asset ratio and non-performing loans. They also observed that banks with high level of credit growth is associated with a reduced level of non-performing loans, while larger banks incur lesser loan defaults compared to smaller banks. However, the study found with regards to the macro economic variables, that non- performing loans vary negatively with growth rate of GDP, while inflation was positively related to the prime lending rate.

Louzis et al. (2012) examined the determinants of NPLs in the Greek financial sector by using dynamic panel regression method for the period 2003-2009 that includes both a period of growth as well as the downturn. The study concluded that macroeconomic variables, specifically the real GDP growth rate, the unemployment rate and the lending rates have a strong effect on the level of NPLs.

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 found a significant negative relationship of ROA & GDP growth rate, and also positive relationships of unemployment rate, the loan loss reserves to total loans and the real interest rate with NPLs. For a significant positive association between NPLs and real interest rate, they justify that when a rise in real interest rates can immediately leads to an increase in non-performing loans especially for loans with floating rate since it decreases 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 engage in risky activities such as granting risky loans.

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 1990-2011periods. 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 found negative effect of lending rate and GDP growth rate on NPLs. Their justification for negative association between lending rate and NPLs 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.

Pasha and khemraj (2009) determinants of non-performing loans in the Guyanese banking sector using a panel data set and a fixed effect model. Find that the real effective exchange rate has a significant positive impact on non-performing loans. This indicates that whenever there is an appreciation in the local currency the non-performing loan portfolios of commercial banks are likely to be higher. Empirical results show that GDP growth is inversely related to non-performing loans, suggesting that an improvement in the real economy translates into lower non-performing loans. Also find that banks which charge relatively higher interest rates and lend excessively are likely to incur higher levels of non-performing loans. No evidence supports the large banks are more effective in screening loan customers when compared to their smaller counterparts.

Farhan et al. (2012) investigated the economic factors causing NPLs in the Pakistani banking sector using a primary data collected via a structured questionnaire from 201 bankers who are involved in the lending decisions or analyze the credit risk or handling NPLs portfolio. Correlation and regression analysis was carried out to analyze the impact of selected independent variables (Interest Rate, Energy Crisis, Unemployment rate, Inflation, GDP Growth, and Exchange Rate) on the NPLs of Pakistani banking sector. According to the results, Pakistani bankers perceive that Interest Rate, Energy Crisis, Unemployment, Inflation, and Exchange Rate has a significant positive relationship with the non-performing loans of Pakistani banking sector while GDP growth has significant negative relationship with the non-performing loans of Pakistani banking sector.

Jellouli (2009) conducted a study on bank specific determinants and the role of the business and the institutional environment on Problem loans in the Mena countries for the period 2002-2006. 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.

Boudiga (2009) empirically analyzed the cross-countries determinants of NPLs and the potential impact of regulatory factors on credit risk exposure. The study used aggregate banking, financial, economic and legal environment data for a panel of 59 countries over the period 2002-2006. The study used the ratio of NPLs as dependent variable. On the other hand, the independent variables include capital to risk-weighted assets minus the required minimum capital, one year lagged loan loss reserves to total loans ratio, one year lagged return on assets ratio, percentage of state-owned banks, percentage of foreign ownership, percentage of assets held by the five largest banks and one year lagged real GDP growth. The results imply that higher capital adequacy ratio and provisioning policy are correlated with a decrease in NPLs.

2.4. Related Empirical Studies in Ethiopia

Tesfaye (2015) assessed bank specific determinants of nonperforming loans in Ethiopian private commercial banks. The quantitative research approach was adopted for the study and survey conducted with professionals engaged in these private commercial Banks of credit departments using a self-administered questionnaire and in-depth interview. The findings of the study show that poor credit risk assessment, under developed credit culture/orientation, poor understanding of credit terms and conditions, imposing highest interest rate on loan, poor credit monitoring and rapid credit growth or greater risk appetite for the occurrence of nonperforming loans. The study suggested that banks should put in place appropriate terms and conditions, impose moderate

lending rate, restrain from engaging in aggressive lending, put in place efficient credit process, give due emphasis in developing the competency of credit operators, proactive monitoring; organizational capacity enrichment of banks with exerted effort to develop culture of the community towards credit and its management.

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

Aemiro and Rafisa (2014) the study examined the bank specific determinants of credit risk in Ethiopian commercial banks and quantitative research approach was adopted. A balanced panel data of 10 commercial banks both state-owned and private owned for the period 2007 through 2011 has been analyzed using random effects GLS regression. The regression results revealed that credit growth and bank size have negative and statistically significant impact on credit risk. Whereas, operating inefficiency and ownership have positive and statistically significant impact on credit risk. Finally, the results indicate that profitability, capital adequacy and bank liquidity have negative but statistically insignificant relationship with credit risk.

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

constantly monitor each borrower's circumstances to detect loan problems before they become uncorrectable.

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

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

Dula (2010) is study entitled Non-performing loan and its management: the case of Dashen Bank Mekelle Area identified ineffective loan monitoring and poor credit appraisal as the major factors accounting for non-performing loan from the lending institution side and lack of proper

education on business area, lack of sufficient income, absence of sufficient infrastructure, lack of sufficient supervision from the bank, lack of saving account, high consumption expenditure and high interest charge as the causes for non-performing loan from the borrower side.

2.5. Conclusions and knowledge gap

The literatures indicate NPLs are influenced by macroeconomic and bank specific factors. However, the impact of the variables differs depending on economic condition, political stability, loan policy etc. Most of the studies are conducted in developed banking industry. As knowledge of the researcher, limited number of literatures in Ethiopian banking industry has been conducted. For instance, Negera (2012), Meshesha (2015), and Tesfaye (2015) assessed the determinants of NPLs in Ethiopian commercial banks and considered only bank-specific variables in their study. However, macroeconomic variables were included and analyzed the effects could be appropriate since similar studies has demonstrated these variables have significant effect on NPLs. Dula (2010) concentrated on managing of NPL and the study used only one private bank does not consider other private and state bank have large amount of market share. Mesay (2017) assessed the determinants of non-performing loan growth rate with emphasis on manufacturing sector and considered macroeconomic variables (deposit Interest rate, exchange rate and annual inflation rate), bank specific (loan to deposit ratio, credit monitoring and follow-up and loan growth rate) and business characteristic (business profit margin and nature of business). Anisa (2015) studied the determinants of non-performing loans of commercial banks in Ethiopia. The included variables were macroeconomic (deposit rates, GDP growth rate, lending interest rate, and inflation rate) and bank specific (cost efficiency, solvency ratio, and loans to deposit ratio). Aemiro and Rafisa (2014) examined the bank specific determinants of credit risk in Ethiopian commercial banks. Zelalem (2013) examined the bank-specific and macro-economic determinants of Non- performing loans (NPLs) of commercial banks in Ethiopia. The macroeconomic factors considered were effective exchange rate, inflation rate, gross domestic product, and lending rate; bank specific variables were loan growth, bank size, state ownership, financial performance, operational efficiency, and income diversification. Ayalew (2009) observed the legal problems in realizing NPLs of Ethiopian banking sector.

Most of these studies used descriptive analysis and correlations matrix for the analysis. These methods only provide simple summaries about the sample and doesn't indicate the strength of the relationship between dependent and independent variables. In addition, several studies conducted in different countries, indicate that a number of macroeconomic and bank specific variables explained the level of NPL. In this respect, as knowledge of the researcher, few of these determinant variables are considered in similar studies conducted so far.

Therefore, this study will incorporate some of the significant determinants of NPL like Net interest margin, Capital adequacy ratio and Unemployment rate that are not considered in Ethiopian context. Generally, the study is expected to fill the existing literature gap in the area of the study by employing macroeconomic and bank specific factors and empirically examine their effect on NPLs of commercial banks in Ethiopia.

2.6 Conceptual Frame Work

The main objective of this study is to examine the determinants of NPLs of commercial banks in Ethiopia. Based on the objective of the study, the following conceptual model is framed. As previously discussed in the related literature review parts; nonperforming loans are affected by both bank specific and macroeconomic factors. Bank specific factors are capital adequacy ratio, return on equity, net interest margin, loan loss provision, and loan to deposit ratio; whereas macroeconomic factors are lending rate, inflation rate, unemployment rate and Gross domestic product (Farhan *et al.*, 2012; Ahlem M. and Fathi J. 2013; Shingjergji, 2013; Sakiru *et al.*,2011; Ahmad & Bashir, 2013; Saba *et al.*,2012; Louzis *et al.*,2012; and Negera, 2012).

The following conceptual model is framed to summarize the main focus of the study.

Figure 2.1 Conceptual framework

Source: The conceptual framework or model of the study adopted from Ahlem M. and Fathi J. (2013); Louzis et al. (2012); Zelalem (2012); and Farhan et al. (2012)

CHAPTER THREE
RESEARCH METHODOLOGY

In the preceding chapter both theoretical and empirical reviews were made and indicated lack of empirical studies regarding the determinants of nonperforming loans of commercial banks in Ethiopia.

The purpose of this chapter is to present model specification, hypotheses and research approach that will be used in the study. The chapter is arranged as follows. 3.1 presents hypotheses for the study. This is followed by the research approach adopted, the population and sampling design for the study under section 3.2. Section 3.3 presents variable description and model specification. Section 3.4 presents diagnostics test of classical linear regression model assumptions**.** Data analysis and presentation techniques are explained in section 3.5. Finally, summary of the link between hypotheses and data sources is presented in section 3.6

3.1 Hypotheses development

The objective of the study is to examine the determinant of Ethiopia Commercial Bank's NPL. NPL is the independent variable that can be explained by different factors and its determinants are classified into two: bank specific and macroeconomic variables (Saba et al. 2012; Louzis et al., 2012; Boudriga et al., 2009 and Skarica, 2013). The bank-specific variables are internal factors and controllable by bank managers while the macroeconomic variables are uncontrollable and external factor. Therefore, it is presented the bank-specific and macroeconomic variables related with hypothesis development under this section.

Loan to deposit (LTD) ratio: According to (Louzis et al.,2012; Makri et al., 2014 and Swamy 2012). LTD ratio has positive and significant effect on the level of NPLs of banking sectors. As

disclosed by Jimenez and Saurian (2006) loan growth is considered as one of the most important causes of problem associated NPLs. According to Sinkey and Greenwalt (1991) a rapid expansion of loan may not be a problem by itself but such expansion leads to poor screening and lending to borrowers of inferior quality. In this respect the study expected positive relation with non-performing loan.

H1. Loan to deposit ratio has a significant positive relationship with Nonperforming loans of banks.

Net interest margin (**NIM**): According to Rahman et.al (2017) interest margin has a positive relationship with aggregate NPLs Such a positive relationship suggest that a high proportion of problem loans may cause banks to increase their interest margin to compensate for possible default risks (Mendes and Abree, 2003 and Carbo and Rodriguez, 2007). The study expected positive relationship with NPLs

H2. Net interest margin have a significant positive relationship with Nonperforming loans of banks.

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

H3. Capital adequacy ratio has significant negative relation with Nonperforming loans.

Return on Equity (ROE): Ahmed and Bashir (2013) and Makri et al., (2014) found negative relationships between ROE and NPLs, stipulating that more profitable banking sectors are better managed and more prudent in their granting of credit so that higher profitability in the past leads to a lower NPL ratio. Therefore, the study expected negative relationship between return on equity and NPLs.

H4. Return equity have a significant negative relationship with Nonperforming loans.

Loan loss provisions (LLPs): According to Hasan and Wall (2004) where provisions are triggered by default incidents on loans, higher levels of NPLs are associated with high rates of pro-visioning. At the same time, banks anticipating high levels of capital losses might create higher provisions to decrease earnings volatility and to reinforce medium term bank solvency. The willingness of a bank to provision for loan losses is regarded as a strong belief in the future performance of the bank (Ahmad et al. 1999). The overall rate of provisioning reflects the general attitude of the banking system toward risk. According to Ahlem and Fathi (2013) and Hasni et al. (2014) loans loss provisions and non-performing loans positive and significant at the 1% level. Banks that anticipate high levels of capital losses may create higher provisions to reduce earnings volatility and strengthen medium-term solvency. The studies expected positive relationship between NPL and LLP.

H5. Loan loss provisions have significant positive relation with Nonperforming loans banks.

Gross domestic product (GDP): Previous study indicated GDP significantly negative relationship with NPL (Saba *et al.*,2012; Louzis *et al.*,2012; Tsige, 2013 and Fofack,2005). Their explanation that GDP enhancement reflect the economy growth and development when the economy growth increases the borrower income and able to pay their debit at payment period and it's contribute to lower NPLs. Fainstein and Novikov (2011) suggests that real GDP growth was the main driver of nonperforming loan ratios. Therefore, a drop in global economic activity remains the most risk for banks asset quality. Previous researcher's unveiled inverse relationship between GDP growth and the level of NPLs (Salas and Suarina, 2002 and Hou, 2007). This study expected a negative relationship between GDP and NPLs.

H6. Gross domestic product (GDP) has significant negative relationship with Nonperforming loans of banks.

Unemployment rate (UN): According to Vogiazes and Nikolaidu (2011) income and unemployment rates were the main cause for loan losses. (Bofondi and Ropele, 2011 and Saba et al., 2012) found that non-performing loans were positively associated with the unemployment rates. Their justification was unemployment negatively affects income of individuals thereby

increasing their debt burden and reduces consumption. Unemployment contributes to higher NPLs. This study expected positive relationship between unemployment and NPLs

H7. Unemployment rate have a significant positive relationship with Nonperforming loans of bank.

Exchange Rate (EXR): An exchange rate is the value of one nation's currency versus the currency of another nation or economic zone.
(https://www.investopedia.com/terms/e/exchangerate.asp)

H8. Exchange rate has a significant and negative relationship with Nonperforming loans of banks.

Inflation (INFL): Inflation is a quantitative measure of the rate at which the average price level of a basket of selected goods and services in an economy increases over a period of time (https://www.investopedia.com/terms/i/inflation.asp)

H9. Inflation has a significant and negative relationship with Nonperforming loans of banks.

3.2 Research approaches

According to Creswell (2009) there are three types of research approach: the first one is **qualitative research** involves emerging questions and procedures, data typically collected in the participant's setting and its purpose is describing and understanding the phenomena. The approach makes considerable use of inductive reasoning. Qualitative research approach has five common strategies of inquiry. The strategies include case study, ethnography, phenomenological study, grounded theory and content analysis.

The second one is **quantitative research**; is an approach for testing objective theories by examining the relationship among variables. These variables in turn can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures building in protections against bias, controlling for alternative explanations, and being able to generalize and replicate the finding (Creswell, 2013). Quantitative research approach has two strategies of inquiry. The first is survey design which provides a quantitative or numeric description of trends

attitude or opinion of a population by studying a sample of that population. From the sample, the researcher generalizes about the population. The second type is experimental design used to test the effect of intervention on an outcome controlling all other factors which may influence that outcome. In experiment design researcher may also identify a sample and generalize to a population (Creswell,2009). Experimental designs are research approach for obtaining information about causal relationship and also allowing research to assess the correlation between one variable and another (Kothari, 2004). The analysis is made based on deductive reasoning beginning with certain theory or hypotheses and drawing logical conclusions from it. The last one is **mixed method** research it is an approach that combines both qualitative and quantitative forms (Creswell, 2009).

3.2.1 Research methods

The aim of the study is to investigate the factors affecting NPLs of commercial banks in Ethiopia. The characters of the study examine derived hypotheses and specify the relationship among variables (typically in terms of magnitude or direction) rather than developing it. The study is an explanatory research that will use quantitative research approach

Creswell (2013) discussed that explanatory studies unlike descriptive studies go beyond observing and describing the condition and tries to explain the reasons of the phenomenon. Explanatory research is devoted to finding causal relationships among dependent and independent variables. It implies how and why variables should be related and the existence of or a change in one variable or cause leads to change in other variable.

This study used quantitative approach, as it is the best approach to test hypotheses and to identify factors that influence on outcome (Creswell, 2013). Quantitative approach specifies how and why the variables are interrelated and why independent variable, influence or affect a dependent variable non-performing loan so, the quantitative approach better provides and explain cause and effect relation. Quantitative approach can be expressed in terms of quantity and attempts to avoid bias in measurement by using standardized measurement tools in interpretation by using defined data categories. It measures what happens (reliable and objective) rather than how someone feels about what happens(subjective). It tests a sample and generalize a population Often reduces and restructures a complex problem to a limited number of variables (Creswell, 2013). In short the

quantitative approach tends to avoid subjectivity and stays impartial. In this respect the study being investigative in nature, using quantitative approach for data analysis would enable the study to observe independent variable has any impact upon the dependent variable (NPL of commercial banks in Ethiopia) or not. The study will use Experimental (quantitative) designs for obtaining information about causal relationships, allowing to assess the correlation (relationship) between one variable and another with structured record reviews (documentary analysis) financial information collected from secondary data such as National Bank of Ethiopia publication, annual reports of the banks, central static agency and other relevant sources.

3.2.2 Sample design

The target population of the study was all commercial banks registered by NBE. According to (NBE 2016) the country has one public-owned and sixteen private commercial banks which are operating throughout the country such as: Commercial bank of Ethiopia , Dashen Bank S.C, Awash International Bank S.C, Wogagen Bank S.C, United Bank S.C , Nib International Bank S.C , Bank of Abyssinia S.C , Lion International Bank S.C , Cooperative Bank of Oromia S.C , Berehan International Bank S.C , Buna International Bank S.C , Oromia International Bank S.C , Zemen Bank S.C , Addis International Bank S.C, Abay Bank S.C , Enat Bank S.C and Debub Global Bank S.C

The study used purposive non probability sampling method because purposive enables to use the researcher judgment to select sample and best to meet the research objectives. The sample ECBs are selected based on registration period and credit disbursement share. It is better to make generalization for the banking sector of the country based on data drawn from sample bank by mixing much more experienced with fairly experienced bank and had the highest credit share in the industry.

The study took sample units of the nine commercial banks from the aggregate of seventeen commercial banks. Commercial Bank of Ethiopia, Dashn Bank, Zemen Bank, Wegagen Bank, Awash International Bank, Bank of Abyssinia, Cooperative Bank of Oromia, United Bank and Nib International Bank. Commercial Bank of Ethiopia is state owned and the rest are private commercial banks. The study employed twelve years unbalanced panel data from 2006-2017 because Zemen bank has only nine years' data. However, Zemen bank had the highest credit

share compare to other new-comer commercial banks. Therefore, the study had 105 observations.

3.3. Variable description and Model specification

Nonperforming loan is the dependent variable of the study while the independent variables are gross domestic product, inflation, unemployment, net interest margin, capital adequacy, loan loss provisions and loan to deposit Ratio. The study will use Ordinary least squared (OLS) model to test the statistical significance of variables.

3.3.1. Definition of variables and their measurement

The operational definition of dependent and independent variable's presented under this section (https://www.investopedia.com/terms).

Dependent variable

Nonperforming loan: is any loan in which interest and principal payments are more than 90 days overdue or more than 90 days' worth of interest has been refinanced (IMF, 2009). For this study the measurement of NPLs is according to NBE (2012) Substandard, Doubtful and Loss. The NPL ratio measure how much of the bank loans and advances are becoming nonperforming. The amount of NPL ratio increases represents the low quality of bank asset. Nonperforming loan ratio is measured by nonperforming loan to total loan

Loan to deposit: it examines bank liquidity by measuring the funds that a bank has utilized into loans from the collected deposits. LTD ratio indicates the banks willingness to use depositors fund on credit activity to meet loan demand by reducing their cash assets. The LTD ratio measured by total loan to total deposit.

Net interest margin: is the difference between interest income and interest expenses as a percentage of total loans and advances which includes deposits with foreign banks, treasury bills and other investments. Interest income results from variation between charges on loans and payment for deposits. NIM measured by net interest income divided by total earning asset.

Capital adequacy: it is the amount of Equity which holds against risky assets reserve to protect the depositors from any unexpected loss. It is expressed by total Equity to total asset ratio.

Return on equity: it measures profitability by revealing how much profit a bank can generates with the money shareholders have invested and it represents the rate of return generated by the owners' equity. ROE measured by the ratio of net profit to total equity.

Loan loss provision: it is controlling mechanism over expected loan losses arising from lending business and protected against anticipated loss. It measured by the ratio of loan loss provision to total loan.

Real gross domestic product: is the best way to measure a country's economy. It includes everything produced by all the people and companies that are in the country. The variable measured by the annual percentage of real GDP.

Un-employment rate: is a phenomenon that occurs when a person who is actively searching for employment is unable to find work. The variable measured by annual percentage of unemployment rate.

Exchange Rate: An exchange rate is the value of one nation's currency versus the currency of another nation or economic zone.

Inflation: Inflation is a quantitative measure of the rate at which the average price level of a basket of selected goods and services in an economy increases over a period of time

Independent variable

Table 3.1 Summary of Variables measurement and expected relation between dependent and independent variables

Symbol	Explanation	Measurement	Expected sign
NPL	Nonperforming loan	NPL/Loan	
LTD	Loan to deposit ratio	Loan/Deposit	+
NIM	Net interest margin	NIM/Total asset	+
CAR	Capital adequacy	Total equity/Total asset	-
ROE	Return on equity	Net income /Total equity	-
LLP	Loan loss provisions	LLP/Total loan	+
GDP	Gross domestic product	The annual GDP growth rate	-
UN	Unemployment rate	The annual unemployment rate	+
INFL	Inflation	The annual inflation rate	-
EXR	Exchange rate	Annual effective Exchange rate of Ethiopian birr in terms of dollar	-

Source: *Developed by the researcher*

3.3.2. **Model specification**

The objective of the study is to examine the determinant of NPLs in Commercial Banks of Ethiopia. The dependent variable of the study is non-performing loan while the Independent variables are Gross Domestic Product, Unemployment, Net interest margin, Capital adequacy,

Return on equity, Loan loss provisions, and Loan to Deposit Ratio.

$Yit = \beta o + \beta Xit + \varepsilon it$

Where: -

Yit is non-performing loan for firm ‘i’ in year ‘t’

β0 is the constant term

β is the coefficient of the independent variables of the study,

Xit is the independent variable for firm 'i' in year 't' and

εit the normal error term.

The study uses the above general model to examine the determinant of NPL based on selected variables as follow**s:**

$$NPL_{it} = \beta 0 + \beta 1(LTD)_{it} + \beta 2(NIM)_{it} + \beta 3(CAR)_{it} + \beta 4(ROE)_{it} + \beta 5(LLP)_{it} + \beta 6(GDP)_{it} + \beta 7(UN)it + \beta 8(INFL)_{it} + \beta 9(EXR)_{it} + \varepsilon it$$

Where;

β0 is an intercept

β1, β2, β3, β4, β5, β6 and β7 represent estimated coefficient for specific bank I at time t,LTD, CAR, NIM, LLP, ROE, GDP, UN, INFL and EXR represent Loan to deposit ratio, capital adequacy, and net interest margin, Loan loss provisions, return on equity, gross domestic product unemployment, inflation and effective exchange rate respectively.

εit represents error terms for intentionally/unintentionally omitted or added variables.

Random Effect versus Fixed Effect Models: Econometrics model used to examine the impact of Loan to deposit ratio, Net interest margin, Capital adequacy ratio, Loan loss provision, return on equity, Growth domestic product, Unemployment on nonperforming loans of Ethiopia commercial banks was panel data regression model which should be either fixed-effects or random-effect model. The study used Hausman Specification Test to identify whether fixed effect or random effect model is appropriate for study.

Table 3.7: Result of model selection Test: Hausman test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	2.867535	5	0.8301

Source: Developed by the researcher through Eviews 9

As shown in Table 3.7, the Hausman specification test for this study has a p-value of 0.8301for the regression models. This indicates that p-value is not significant and then the null hypothesis is not rejected justifying as random effect model is appropriate for the given data set in this study.

To examine the determinants of NPLs of commercial banks in Ethiopia, the study employed both bank specific and macroeconomic variables. Since there are more than one predictor variables, multivariate multiple regressions model was conducted by the OLS method using EVIEWS 9 econometric software package. According to Petra (2007) OLS outperforms the other estimators when the cross section is small and the time dimension is short. According to Brooks (2008) OLS or linear least squares is a method to estimate the slope and intercept in a linear regression model. Therefore, as far as the above facts true in the study used OLS method. The rational for choosing OLS is that, if the Classical Linear Regression Model (CLRM) assumptions hold true, then the estimation determined by OLS have a number of desirable properties, and are known as Best Linear Unbiased Estimators (Brooks 2008). The following section discussed CLRM assumptions and their diagnostics test result.

3.4. Diagnostics test of Classical linear regression model assumptions.

Ten explanatory variables; five bank specific (loan to deposit, net interest margin, capital adequacy ratio, return on equity and loan loss provision), five macroeconomic variables (GDP, unemployment, exchange rate, lending rate, and inflation) are included in the model.

Table 3.1 correlation test among explanatory variables

	NIM	LTD	LLP	CAR	ROE	EXR	GDP	UM	LR	INFLN
NIM	1.000000									
LTD	0.699276	1.000000								
LLP	0.791130	0.699276	1.000000							
CAR	-0.535725	-0.646114	0.043919	1.000000						
ROE	-0.059497	-0.152689	0.234712	0.347749	1.000000					
EXR	0.971652	0.950539	0.762449	-0.521881	-0.063092	1.000000				
GDP	-0.822008	-0.795187	-0.789231	0.361867	-0.215071	-0.770628	1.000000			
UM	-0.546114	0.884117	0.739199	-0.484785	0.165317	0.934092	-0.850850	1.000000		

LR	0.984446	-0.091145	0.267616	0.429966	0.317020	0.013166	0.093566	-0.007286	1.000000	
INFL	0.913903	0.884117	0.739199	-0.484785	0.165317	0.934092	-0.850850	-0.521881	-0.063092	1.000000

According to Brooks (2008) assumptions were made relating to the classical linear regression model (CLRM). Every estimation of the model should have to meet the OLS assumptions to be the estimation BLUE (Best Linear Unbiased Estimators). The following sections discussed the results of diagnostic tests (heteroscedasticity, autocorrelation, normality and model specification test) that ensure whether the data fits the basic assumptions of classical linear regression model or not.

Heteroscedasticity: According to Brooks (2008) the variance of the errors must be constant (homoscedasticity). If the error terms do not have a constant variance, said to be Heteroscedasticity. Heteroscedasticity test is very important because if the model consists of heteroscedasticity 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. The study used Autoregressive Conditional Heteroscedasticity (ARCH) to test the presence of heteroscedasticity.

Table 3.2: Result of Heteroscedasticity Test: ARCH

Heteroscedasticity Test: ARCH

F-statistic	0.203311	Prob. F(1,92)	0.7532
Obs*R-squared	0.207406	Prob. Chi-Square(1)	0.5588

Source: Developed by the researcher through Eviews 9

As shown in table 3.2 ARCH test statistics indicate the p-values of F-statistic and Chi-Square (Developed for the0.7532 and 0.5588 respectively. F-statistic and Chi-Square excess from significant level of 0.05. The p-values of F-statistic, Chi-Square suggest that no evidence for the presence of heteroscedasticity.

Autocorrelation: This is an assumption that the errors are linearly independent of one another

(uncorrelated with one another). According to Brooks (2008) when the error term for any observation is related to the error term of other observation, it indicates autocorrelation problem in the model. In the case of autocorrelation problem, the estimated parameters can still remain unbiased and consistent, but it is inefficient. In this study to test for the existence of autocorrelation, the popular Breusch-Godfrey Serial Correlation LM Test was employed.

Table 3.3: Breusch-Godfrey Serial Correlation LM Test:

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	2.514146	Prob. F(2,89)	0.0770
Obs*R-squared	5.309093	Prob. Chi-Square(2)	0.0603

Source: Developed by the researcher through Eviews 9

As shown in 3.3, the p value is 0.0603 which is greater than significance level of 0.05. F and $\chi 2$ statistic test indicate that the model does not evidence for the presence of autocorrelation problem. It can be concluded that we do not reject the null hypothesis (H0).

Normality: A normal distribution is not skewed and is defined to have a coefficient of kurtosis 3. Jarque-Bera formalizes this by testing the residuals for normality and testing whether the coefficient of skeweness and kurtosis are zero and three respectively. Skewness measures the extent to which a distribution is not symmetric about its mean value and kurtosis measures how far the tails of the distribution. This study used Jarque-Bera Test (JB test) to find out whether the error term is normally distributed or not.

Table 3.5: Result of Normality Test: Jarque -Bera test

	Probability (P-value)	Decision Rule p <0.05
Kurtosis	**2.91244**	Do not Reject the H0
Jarque-Bera Test	**0.663173**	

Source: Developed by the researcher through Eviews 9

As shown in the Table 3.5 indicated that distribution of the panel observation is symmetric about its mean. Kurtosis closes to 3 (i.e. **2.91244**), and Jarque-Bera statistic has a P-value of 0.66 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.

Ramsey RESET tests: which is a general test for misspecification of functional form. According to Brooks (2008) Specification error occurs when omitting a relevant independent variable, including unnecessary variable or choosing the wrong functional form, so that regression model will be wrongly predicted. If the omitted variable is correlated with the included variable, the estimators are biased and inconsistent. If the omitted variable is not correlated with the included variable, the estimators are unbiased, consistent and model specification error will not occur. Ramsey-RESET Test employed to test the developed model is correct or not.

Table 3.6: Result of model specification Test: Ramsey-RESET test

Ramsey RESET Test
Equation: UNTITLED
Specification: NPL NIM LTD LLP CAR ROE GDP UM C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.386257	85	0.6503
F-statistic	0.149195	(1, 85)	0.6503

Source: Developed by the researcher through Eviews 9

From table 3.6 it can be concluded that this research does not reject null hypothesis (H0), since the p value is 0.6503, which is greater than significance level of 0.05. Thus, it can be concluded

that the model specification is correct in sample period Overall reliability and validity of the model.

3.5. Data Analysis

According to Baltagi (2008), using panel data is better due to three main reasons. First, panel data allows the researcher to account for the heterogeneity across individual units (banks in this study). Second, panel data provide a large number of data points, which increase the degrees of freedom and reduce co-linearity among the independent variables. This increases the efficiency of the estimated parameters. Finally, it enables the researcher to deal with the bias associated with the omission of time-invariant variables. Given these advantages and following (Ahelem & Fathi 2013), this study employs the unbalanced panel data analysis techniques to determine the factors that determine the NPL of Ethiopian commercial bank.

This study used quantitative panel data. This approach allows to obtain information about causal relationships and to assess the correlation (relationship) between one variable and another. Quantitative studies are typically experiments that test a theory composed of variables (constructs or phenomena), measured with numbers, and analyzed using statistical procedures. They take the perspective that events can be understood in terms of cause and effect. In this respect the study being investigative in nature, using quantitative approach for data analysis will enable the study to observe independent variable has any impact upon the dependent variable (NPL of commercial banks in Ethiopia) or not. The study employed secondary data from sample banks' balance sheet and National Bank of Ethiopia publication to assess the determinant of NPL and the study used random effect multiple regression analysis.

To test the proposed hypotheses, statistical analyses have been carried out using the following methods: First, descriptive statistics of the variables (both dependent and independent) was calculated over the sample period and this was in line with Malhotra (2007), which states using descriptive statistics methods helps the researcher in picturing the existing situation and allows relevant information. Then, a correlation analysis between dependent and independent variables was made. Finally, ordinary least square/OLS regression approach including its assumptions was employed. Data collected from different sources was analyzed by using Eviews 9 software package

3.6. Summary of the link between hypotheses and data sources

The methodology section describes the behavior of study and the method used to achieve the general objective of the study and also discussed the independent and dependent variable related with developed hypothesis. The objective of the study is to investigate the determinant of nonperforming loan and the characters of the study examine derived hypotheses and specify the relationship among variables rather than developing it. The study is explanatory type research and it employed quantitative approach with experimental strategy of enquiry and used secondary data to achieve the general objective. A Sample of nine banks was selected from seventeen banks registered by NBE depending on their operation period and credit disbursement share. The random effect multiple linear regressions model was conducted by the ordinary listing square and CLRM assumptions test of the models does not evidence for the presence of normality, heteroscedasticity and autocorrelation problem.

Table 3.8 Link between research hypotheses, variables and data sources

HP No.	Hypotheses	Variables	Data sources	Specific data item
1	Loan to deposit affect NPLs	NPLs and LTD	Banks' financial statements and NBE's annual reports	From annual financial statement and un published report
2	Net interest margin affect NPLs	NPLs and NIM		From annual financial statement
3	Return equity affect NPLs	NPLs and ROE		
4	Capital adequacy affect NPLs	NPLs and CAR		
5	Loan loss provision affect NPLs	NPLs and LLP		

6	Exchange Rate affect NPLs	NPLs and EXR		
7	Growth domestic product affect NPLs	NPLs and GDP	NBE annual report	Annually average rate
8	Unemployment affects NPLs	NPLs and UN	Central static agency(CSA)	Annually average unemployment rate
9	Inflation affects NPLs	NPLs and INFL		Annually average rate

Source*: Developed by* the researcher

CHAPTER FOUR

RESULTS AND DISCUSSION

In the preceding chapters important literatures relating to the topic were reviewed that gives enough understanding about the topic and identified the knowledge gap on the area. To meet the broad research objective and to test research hypotheses, the method used for this study discussed under the research methodology chapter.

This chapter deals with the finding and discussion of the result in order to achieve research objectives and set a base for conclusion. The first section 4.1 of this chapter was mainly start with the explanation for study variables and discussed the result of descriptive statistics then presented the regression analysis in detail under section 4.2. Finally set a summary for the chapter under section 4.3.

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 4.1. The dependent variable nonperforming loans and the independent variables that were classified into two, the macro economic factors (gross domestic product, unemployment, inflation and exchange rate) and bank specific factors (loan to deposit, loan loss provision, capital adequacy, return on equity and net interest margin) which were used to see their impact on non-performing loan. The total number of observation for each variable was 105. 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 4.1: Summary of descriptive statistics for dependent and independent variables

Variable	**Observations**	**Mean**	**Median**	**Max**	**Min**	**Standard deviation**
Non-performing loans	**105**	7.49	3.36	21.05	0.15	3.12
Loan to deposit ratio	**105**	59.20	59.40	122.50	28.00	34.40
Net interest margin	**105**	4.982	4.69	12.50	0.490	2.19
Capital adequacy ratio	**105**	11.46	12.17	52.26	3.90	4.94
Loan loss provision	**105**	3.80	2.60	20.17	0.68	2.92
Return on equity	**105**	25.35	25.68	74.41	-19.20	16.00
Gross domestic product	**105**	10.32	10.40	11.80	8.00	1.11
Unemployment rate	**105**	13.94	17.10	21.40	5.50	3.91

Inflation	**105**	0.109	0.089	0.364	-0.106	0.117
Exchange rate	**105**	0.101	0.088	0.165	0.083	0.024

Source: Financial statements of sampled commercial banks, NBE report, CSA reports and Developed by the researcher through Eviews 9.

As can be seen from table 4.1 for the total sample, the mean of NPLs was 7.49% with a minimum of 0.15% and a maximum of 21.05 %. The mean value suggests that from the total loan Ethiopian commercial banks disbursed on average 7.49% were being default or uncollected over the sample period. This indicates that Commercial banks in Ethiopia incurred 7.49%NPLs on averages from its total loan. According to Ethiopian context, the banking sectors are required to maintain the ratio of NPLs at least below 5% (NBE, 2008). However, as indicated above in table 4.1, the NPLs of commercial banks in Ethiopia are more than the required threshold. Thus, NPLs problem are still serious for commercial banks in Ethiopia.

Regarding LTD ratio that measured by total loans divided by total deposits, it ranges from a minimum of 28.00% to a maximum of 122.50%. It has a mean of 59.20% with highest deviation (34.40%) from its mean value. The average 59.20 % shows that ECBs provide on average 0.59 cent loan from one birr collected deposit. The maximum and minimum was 122.5 % and 28% respectively. This implies that the ECBs concentrate on lending business which is exposed to risk using depositors' money. The maximum value also is a surprise on how banks lend excess of their total loan and engaged in high risk taking activity. This may be due to the fact that commercial banks may choose to diversify their credit portfolio, thus reducing their credit risk exposure.

The mean value for net interest margin was 4.98 % whereas the maximum level was 12.5% and minimum one was 0.49% with a standard deviation of 2.19 %. The highest NIM indicates that interest income is greater than the interest expense and most profitable bank earned 0.12 cent from one birr of total asset. High interest margins implies that banks are able to earn more profits on the loan they give. This helps banks to have a higher level of cushion on a loan. If the economic cycle turns decrease and insolvency increases, higher net interest margin helps banks absorb a higher degree of shocks.

CAR also measured by total equity divided by total assets presents a minimum of 3.9 and maximum of 52.26% with a mean value and standard deviation of 11.46% and 4.49% respectively. This indicates that CAR for the sample commercial banks in Ethiopia during study period was greater than the minimum capital requirement 8% of the NBE showing that EBCs has ability to bear loss results from loan default.

The mean value of return on equity was 25.35% with the highest 74.41% and the lowest -19.2%. That means, most profitable bank of the sample commercial banks earned 0.74 cents of net income from a single birr of equity investment and the minimum profit earned by one of the sample banks was a net loss of -0.19 cents on each birr of equity investment. The minimum return gain registered by late comer commercial banks because new banks enter in to the industry only having shareholder contribution because of the operation is not started to generate income. The mean of 25.35 % showed that, Ethiopian commercial banks earned 0.25 cents on average for each one-birr capital investment over the sample period. The average returns on equity suggests that ECBs had been producing good return for their owner during the period under study. Return on equity revealed the second highest standard deviation 16 % from its mean compared to other bank specific variable. This implies that commercial banks in Ethiopia have relatively a good performance in terms of ROE.

Loan loss provision shows the default risk that the bank expects to sustain from lending business. The mean value of Loan loss provision 3.8% whereas the maximum level was 20.17 % and minimum one was 0.68% with a standard deviation of 2.92%.

Among macroeconomic variables the study employed unemployment, inflation, exchange rate and GDP. The mean of unemployment is 13.94 % with minimum of 5.5% and maximum of 21.40 %. Unemployment had a higher standard deviation compare to GDP which was 3.91% this implies that unemployment rate in Ethiopia during the study period remains unstable compare to GDP. The average GDP growth in Ethiopia for the sample period was 10.31% with a standard deviation of 1.11% implies the economic growth in Ethiopia during the sample period remains stable as compared to the unemployment rate. Among macroeconomic variables employed in this study inflation had a higher standard deviation which was 0.117. This implies that inflation rate in Ethiopia during the study period remains somewhat unstable. Moreover, the Standard

deviation of exchange rate (0.024) indicates the existence of less volatility of dollar in terms of Ethiopian birr over the period under consideration. Thus, it can be concluded that, the macroeconomic variables were relatively stable over the sample periods as compared to bank specific variables with the exception of some instability on inflation rate**.**

4.2. Regression results and discussions

The empirical evidence on the determinants of Ethiopian commercial banks' non-performing loan is studied based on unbalanced 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 2006 up to 2017 and a cross section segment which considered nine Ethiopian commercial banks, namely Commercial Bank of Ethiopia, Dashn Bank, Zemen Bank, Wegagen Bank, Awash International Bank, Bank of Abyssinia, Cooperative Bank of Oromia, United Bank and Nib International Bank. The study used random effect multiple liner regression equation to analyze the relationship between Ethiopian commercial banks non-performing loan and determinant variables. All the proposed independent variables (i.e., NIM, LTD, ROE, LLP, CAR, GDP, INFL, EXR and UN) were regressed with respect to the dependent variable (NPLs). The following linear regression model is developed.

$$NPLit = \beta 0 + \beta 1(LTD)it + \beta 2(NIM)it + \beta 3(CAR)it + \beta 4(ROE)it + \beta 5(LLP)it + \beta 6(GDP)it + \beta 7(UN)it + \beta 8(INFL)it + \beta 9(EXE)it + \varepsilon it$$

Under the following regression outputs, the beta coefficient may be negative or positive. Beta indicates that each variable's level of influence on the dependent variable. P-value indicates at what percentage level of each variable is significant. R^2 values indicate the explanatory power of the model and in this study adjusted R^2 value which takes into account the loss of degrees of freedom associated with adding extra variables were inferred to see the explanatory powers of the models.

Table 4.2: Result Random effect regression Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NIM	-0.065676	0.106275	-0.617980	0.5382
LTD	0.067285	0.019401	2.437296	0.0269
LLP	0.533077	0.084367	10.46713	0.0000
CAR	-0.123864	0.055894	-2.824343	0.0059
ROE	-0.034720	0.022119	-2.021767	0.0363
GDP	-0.253075	0.238909	1.059293	0.1424
UM	0.064983	0.057913	1.122089	0.2649
INFL	-0.235798	0.047757	-4.937420	0.0000
EFEX	-1.531906	0.297262	-5.153390	0.0000
C	-1.676830	2.695384	-0.622112	0.5355

R-squared	0.682935	Mean dependent var	4.376492
Adjusted R-squared	0.645500	S.D. dependent var	3.524175
S.E. of regression	2.188054	Sum squared resid	421.7317
F-statistic	22.16342	Durbin-Watson stat	1.696299

Prob(F-statistic)	0.000000

Source: Developed forthe research through Eviews 9

Thus, based on the above table 4.2, the following model was developed to examine the determinants of NPLs in this study.

NPL = -1.676830 - 0.065676NIM + 0.067285LTD + 0.533077LLP - 0.123864CAR- 0.034720ROE - 0.253075GDP + 0.064983UM+-0.235798INFL+ -1.531906EFEX+ε

Table 4.2 shows that the value of the adjusted R-Squared is 64.5% which confirms that 64.5 percent of changes on dependent variable (NPL) are explained by independent variables of the model, 64.5% is more than the conventional recommended rate of 60%. The value of F-statistic (22.16342) confirms the accuracy of the estimated model. F-statistics tests the null hypothesis that all of the slope parameters (β's) are jointly zero. Accordingly, the F-test result shows that the null hypothesis is rejected as the probability of F-stat is 0.0000. In other words, the change in deposit to loan, net interest margin, capital adequacy, loan loss provision, return on equity, GDP, Inflation, Exchange rate and unemployment rate collectively explain 64.5% of the variation in NPLs ratio of ECBs.

Furthermore, the researcher examined the impact of both bank specific and macroeconomic factor on the level of NPLs based on regression result of Random Effect Model in the above table 4.2 in terms of examination of coefficients of explanatory variables and significance level.

Through the examination of coefficients for bank specific factors, NIM, ROE and CAR had negative impact on NPLs having a coefficient of -0.0656, -0.0347 and -0.1238 respectively. This indicates that one unit change in NIM, ROE and CAR can result a change on NPLs rate by 0.0656, 0.0347 and 0.1238 units in opposite direction respectively. However, LTD and LLP had positive impact on NPLs having a coefficient of 0.0672 and 0.5330 respectively. This implies one unit change in LTD and LLP can result a change on NPLs rate by 0.0672 and 0.5330 units in the same direction respectively. Besides, from macroeconomic factors, GDP had negative impact on the level of NPLs having a coefficient of-0.2530 which indicates a one-unit change (increase/decrease) in average GDP growth rate can result a change on NPLs by 0.2530 units in

opposite direction. Whereas unemployment had positive impact on the level of NPLs having a coefficient of 0.0649 which indicates one unit change in unemployment rate can result a change on NPLs by .0649 units. Inflation and exchange rate had negative impact on the level of NPLs having a coefficient of -0.235798 and -1.531906 respectively.

In terms of significance level, all explanatory variables had p-values of less than the selected significance levels (5%) except for UM, GDP and NIM. As shown in the above table 4.2, LTD, LLP, ROE, and CAR had strong and statistically significant bank specific variables and INFL and EXE has strong and statically significant microeconomic variables (p-value < 0.05) impact on the level of NPLs at 5%. However, GDP, NIM and UM had no statistically significant impact on the level of NPLs with a p-value of 0.1424, 0.5382 and 0.2649 respectively.

Thus, contrary to the researcher`s expectation, GDP rate and UM from macroeconomic factors and NIM from bank specific factor did not show any significant impact on the level of NPLs of commercial banks in Ethiopia. Furthermore, the above table 4.2 shows rejection of null hypothesis for NIM.

The following section demonstrates the impact of each explanatory variable on Ethiopian commercial banks NPL.

4.2.1 Loan to deposit (LTD)

Table 4.2 showed that the coefficient of loan to deposit is 0.067285 and positively significant at 5% significant level. This means, holding other factors constant, an increase/decrease in Loan to deposit by one unit will result a 0.067285 increase/decrease of Ethiopian commercial banks NPL. Generally, reject the null hypothesis since there is a positive significant relationship between Loan to deposit and non-performing loans. This result is consistent with expected result for the study also conform the findings of (Swamy 2012; Rahman 2017; Jimenez and Saurian 2006 and Sinkey and Greenwalt 1991), although some studies such as (Makri et al. 2014; Saba et al. 2012; Louzis et al. 2010; and Ranjan and Chandra 2003) found that there is a negative relationship between LTD and NPLs.

A positive relationship between non- performing loans and loan to total asset ratio, implies that

the quality of assets plays a role in the case of Ethiopian commercial banks, the lower the quality assets the banks possess, the higher the NPL (not able to generate income). A positive significant effect of loan to deposit on Ethiopian commercial banks of NPL suggest that borrower wants loan and gives priority to banks provide loan with high interest rate rather than not provide loan. Ethiopian commercial banks to spread their customer base and to increase their deposit use loan as an enticement to attract a new customer. The above mutual interest of lender and borrower contribute for the growth of lone to deposit ratio.

4.2.2 Loan loss provision (LLP)

Regarding the relationship between the variable loans losses provision and non-performing loans, it is positive and significant even at 1% level. Banks that anticipate high levels of capital losses may create higher provisions to reduce earnings volatility and strengthen medium-term solvency. This result is similar to that of Ahlem and Fathi (2013), Hasni et al. (2014), and Hasan and Wall (2004), contrary to the results found by Boudriga et al. (2009). Generally, the study fails to reject the alternative hypothesis (Loan loss provision has a positive and significant effect on Ethiopian commercial banks NPL). Ethiopian commercial Banks that anticipate un collective loan may create provisions to reduce or absorb their risk this motivate Ethiopian commercial banks to provide more loan and engaged in risky activities and ultimately the probability that loans became NPLs will increased with the same manner. Therefore, the findings suggested that, loan loss provision of banks was a vital determinant of NPLs in Ethiopian commercial banks.

4.2.3 Capital adequacy (CAR)

Regarding capital adequacy ratio that determines the risk taking behavior of banks, this study identifies statistically significant and negative impact of capital adequacy ratio on NPLs. Thus, regression result of random effect model in the above table 4.2 is consistent with the hypothesis developed in this study. The study hypothesized that there is a negative association between CAR and NPLs of banks. This negative sign indicates an inverse relationship between capital adequacy ratio and NPLs. Thus, it implies that for one unit change in the banks' capital adequacy ratio, keeping other thing constant had resulted 0.1238 unit changes on the levels of NPLs in opposite direction.

The result is consistent with Hyun and Zhang (2012) and Makri *et al.* (2014). The result of this finding confirms significant negative effect of CAR on the levels of NPLs of commercial banks in Ethiopia by supporting the arguments that state well capitalized banks are better able to resist the levels of risk. This implies commercial banks in Ethiopia are less the incentives to take riskier loan activities due to highly regulated nature of the institution in the country. Thus, negative impact of CAR on NPLs is due to effective regulatory pressures by NBE on capital adequacy ratio of banks and also bank managements' efficient utilization of its capital to absorb NPLs. However, the finding is inconsistent with Boudriga *et al. (*2009), Djiogap and Ngomsi (2012), Shingjerji(2013), Swamy(2012), Salas and Saurina (2002), Ahmad and Ariff, (2007), and Emmanuel (2014).

4.2.4 Return on equity (ROE)

The results of random effect model in the above table 4.2 indicate that there is a negative and statistically significant impact of ROE on the level of NPLs. The result shows strong effect of bank profitability measured in terms of ROE on NPLs with a coefficient of -0.0347 and a p-value of 0.0363 at 5% significance level. This implies that for one unit change in ROE, keeping the other things constant had resulted 0.0363 unit change on the level of NPLs in opposite direction. This result confirms the finding of Makri *et al*. (2014), Massai and Jouini (2013), Boudriga *et al. (*2009), Klein (2013), Shingjerji (2013), Ahmad and Bashir (2013) and Hyun and Zhang (2012).

Contrary to the finding of Louzis *et al. (*2012), this result, as expected, indicates a negative significant effect of ROE on the levels of NPLs of commercial banks in Ethiopia. This implies that deterioration of profitability ratio in terms of ROE leads to higher NPLs. This negative significant impact of ROE on the levels of NPLs indicates the existence of better management of funds invested by shareholders via good agency relationships in commercial banks in Ethiopia. The negative relationship between non-performing loans and return on equity suggest that banks with higher profitability are less enticed to generate income. Thus, they are less constrained to engage in risky activities of granting risky loans.

4.2.5 Net interest margin (NIM)

Table 4.2 indicates that there is statistically insignificant relationship between NIM and the level

of NPLs with P-value of 0.5382, which is within unacceptable range (>5%). This finding inconsistent with Shingjergji (2013). Generally, the study rejects the alternative hypothesis (i.e. there is insignificant and negative relationship between NIM and Ethiopian commercial banks NPL). The negative relation suggest that Ethiopian commercial banks interest margin increase not interested to enter in to doubt loan also high interest margin represent the strength of management.

4.2.6 Real gross domestic product rate (GDP)

Table 4.2, indicates that there is no statistically significant relationship between GDP and the level of NPls, with P-value of 0.1424, which is not within the acceptable range (5%). The finding of the study is consistent with Swamy (2012). The result of the study is inconsistent with the result obtained by Rajan and Dhal (2003), Fofack (2005), Ekanayake and Azeez (2015), Jimenez and Saurina (2006), Khemraj and Pasha (2009), Dash and Kabra (2010), Espinoza and Prasad (2010). It may be argued that the improvement in our real economy, within the period under consideration was not substantial enough to lead to a reduction in the NPLs. This may be due to the fact that credit facilities obtained from the banks were not properly utilized in productive activities or it may be due to customers operating inn a harsh economic environment. Generally, the study rejects the alternative hypothesis (i.e. There is insignificant and negative relationship between GDP and Ethiopian commercial bank NPL).

4.2.7 Unemployment rate (UN)

Concerning the unemployment rate, we found a positive and insignificant relationship with the ratio of non-performing loans with P-value of 0.2649 at a level of 5% and 10%. In fact, unemployed customers cannot meet their commitments and repay the loans which can increase the level of non-performing loans. In this case, the dynamics of the two variables (growth rate of GDP and the unemployment rate) is closely related to households, companies and the ability to meet their financial obligations. An increase in GDP usually leads to greater flows of household income and a rise in profitability. An increase in the unemployment rate limits the current and future purchasing power of households and is generally associated with a decrease in the

production of goods and services. Unemployment negatively affects the cash flows of households and increases the debt burden. Regarding enterprises, rising in unemployment could lead to a decline in production due to the decline in effective demand. This can lead to a decline in revenue and a fragile state debt. The interest rate affects the difficulty in servicing debt, in the case of floating rate loans. This implies that the effect of the interest rate should be positive, and as a result the increasing debt burden caused from rising interest rate payments should lead to a higher number of NPLs. In this study, the results are inconsistent with those obtained by Klein (2013), Selma and Jouini (2013), Louzis et al. (2010), and Bofondi and Ropele (2011). This may be due to the fact that the interest rate of a debt obligation stays constant for the duration of the loan's term. Generally, the study rejects the alternative hypothesis (i.e. there is insignificant positive relationship between UN and Ethiopian commercial bank NPL).

4.2.8. Inflation (INFL)

As mentioned in the literature review part, inflation affects borrowers' debt servicing capacity through different channels and its impact on NPL can be positive or negative. Higher inflation rate can make borrowers debt servicing easier by reducing their real value of outstanding loans. However, it can also weaken some borrowers ability to service debt by reducing their real income. Nevertheless, in this study the coefficient estimate of inflation was negative and statistically significant at 1% significant level (P- value of 0.000). The negative coefficient estimate of inflation (-0.235) indicates a strong inverse association with NPLs. That means an increase in inflation rate; lead a decrease in NPLs. This result was inconsistent with the findings of Fofack (2005), Pasha and Khemraj (2009), Louzis et al. (2010) and Azeem et al. (2012). As the existing theories suggested these relationships appeared in the banking system where the lending rate is not adjusted to the inflation change.

4.2.9. Real effective Exchange rate (EXE)

As shown in the literature review part of this study, the impact of exchange rate on bank's NPLs have mixed implications. Hence, the sign of the relationship between exchange rate and NPL can be positive or negative. A depreciation of the exchange rate can have mixed implications on NPLs of banks. On the one hand, it can improve the competitiveness of export-oriented firms

and ultimately increase their ability to service debt (Fofack, 2005). On the other, it can negatively affect the debt-servicing capacity of borrowers who borrow in foreign currency (import-oriented firms). Despite this fact, the coefficient estimate of effective exchange rate (EFEX) in this particular study revealed negative association with NPLs of ECBs. This result was inconsistent with the findings of Jajan and Dhal (2003), Fofack (2005), Pasha and Khemraj (2009), De Bock and Demyanets (2012) and Castro (2012). The magnitude of the coefficient estimate (-1.53) result of EFEX was the second largest amount next to performance of a bank (ROA).

This indicates that, EFEX had a great impact in explaining the variation of NPLs in Ethiopia commercial banks. Moreover, the coefficient estimate of EFEX was statistically significant at 1% significant level (p-value = 0.0). This implies that, an increase in EFEX (i.e., a depreciation of Ethiopian birr in terms of dollar); lead to a decrease in NPLs of ECBs. More specifically, as the value of Ethiopian birr depreciated in terms of dollar, it can increase the competitiveness export-oriented Ethiopian firms in the international market. This due to the fact that, the operating cost of export-oriented Ethiopian firms was very less as compared to the international firms since the value domestic currency was very small in terms of foreign currency (dollar). Consequently, the debt-servicing capacity of export-oriented Ethiopian firms would improve. This result was in accordance with the import substitution policy of Ethiopian government that encouraging export- oriented firms. In this regard, ECBs are providing loans with lower interest rate to export- oriented firms so as to encourage the export sector. For instance, commercial bank of Ethiopia providing a loan with 7.5 % interest rate for export-oriented firms which is considerably lower than the stated 9.5% interest rate for any other sectors. Hence, the lower interest rate for export-oriented firms can also make their debt servicing easier.

On the other hand, as the theory suggested, depreciation of domestic currency in terms of foreign currency obviously deteriorate the performance of import-oriented firms. In Ethiopia the trading system was often manifested by deficit (high import). In this condition, a negative association between exchange rate (appreciation of dollar) and NPLs was surprised. As per the interviewee's opinion, the import market in Ethiopia was dominated by limited numbers of importers that have strong relationship with banks. Whenever the value of dollar appreciated, small and medium

importers go out of market and those limited large importers dominate the market monopoly. This allows them to manipulate the price as they wish and maximize their profit. Hence, the profit originated from the monopolistic advantage of importers enables their debt servicing easier.

4.3 Summary

This chapter discussed the results of descriptive and regression analysis regarding to the determinant factors of nonperforming loans of ECBs. The regression revealed that LTD, LLP, ROE, CAR, INFL and EFEX are statistically significant factors that determine the NPLs of commercial banks in Ethiopia. On the other hand, NIM, GDP and UN are statistically insignificant to explain Ethiopian commercial banks NPL. The expected sign and the finding of the study are summarized in the following table 4.3.

Table 4.3 Summary of actual and expected signs of explanatory variable.

Hypothesis	Variables	Expected Signs	Actual Signs	Rejected/not rejected	Significance level
H1	Loan to deposit ratio	Positive & Significant	Positive & Significant	Not rejected	5%
H2	Net interest margin	Positive & Significant	Negative & Insignificant	Rejected	1%, 5% and 10%
H3	Capital adequacy	Negative & Significant	Negative & Significant	Not rejected	1% and 5%
H4	Return on equity	Negative & Significant	Negative & Significant	Not rejected	5%
H5	Loan loss provisions	Positive & Significant	Positive & Significant	Not rejected	1% and 5%
H6	Real GDP growth rate	Negative & Significant	Negative & insignificant	Rejected	1%, 5% and 10%
H7	Unemployment rate	Positive & Significant	Positive & Insignificant	Rejected	1%, 5% and 10%
H8	Inflation	Negative & significant	Negative & significant	Not rejected	1%, 5% and 10%

H9	Exchange rate	Negative & significant	Negative & significant	Not rejected	1%, 5% and 10%

Source: Developed by the researcher.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

In previous chapter presented descriptive and regression analysis to examined the determinant of NPL of Ethiopian commercial banks. This chapter discussed the conclusions and recommendations of the study. The chapter organized in to two sections, the first section 5.1 presents the conclusions of the study and section 5.2 presents the recommendations provide depend on the findings of the study and give highlights for further research.

5.1 Conclusion

The main objective of this study was to examine the determinants of nonperforming loans (NPLs) of commercial banks in Ethiopia based on unbalanced panel data analysis on the time period from 2006 to 2017. The data was analyzed by using Random Effect Model. For the purpose of analysis, Eviews 9 was used. The study found out that ROE, CAR, LTD and LLP had statistically significant effect on the level of NPLs. However, the results of fixed effect regression model revealed the insignificant effect of NIM, GDP and Unemployment rate on the level of NPLs of commercial banks in Ethiopia for the period under consideration.

However, bank profitability measured in terms of ROE had negative and statistically significant effect on the levels of NPLs. This implies effective management of commercial banks in Ethiopia on utilization of funds contributed by shareholders. Similarly, the study also found out that capital adequacy ratio has negative and statistically significant impact on NPLs of commercial banks in Ethiopia. This indicates banks with strong CAR have a tendency to absorb possible loan losses and thus, reduce the level of NPLs due to efficient utilization of its capital. The relationship of LTD with the volume of Ethiopian commercial banks nonperforming loan is positive. In this general setting, loan growth of a bank was key determinant of NPLs in ECBs. There is also a positive association between LLP and NPLs of Ethiopian commercial banks. Therefore, Ethiopian commercial Banks that anticipate un-collective loan may create provisions

to reduce or absorb their risk this motivate Ethiopian commercial banks to provide more loan and engaged in risky activities and ultimately the probability that loans became NPLs will increased with the same manner.

5.2 Recommendation

Based on the findings of the study the following recommendations were forwarded.

- Commercial banks in Ethiopia should assess their clients and advance their loans to them according to the creditworthy, as non-performing loans can decrease the level of interest rates and consequently financial performance.

- In order to improve asset quality, specifically loans, it is strongly recommended that bank management and loan officers should always give a serious attention to the health of asset quality of banks specifically loan performance for prevention of loans loss. In order to curtail the chance of occurrence of NPLs; 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. Thus, it is better for the bank managers to efficiently utilize its current assets and loans than fixed assets in order to reduce the level of nonperforming loans.

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

This study recommends future researcher to validate the consistency of the result and provide

additional results by including other variables like priority sector loan, monitory policy and sensitive sector's loan.

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Appendix –I: Tests for the Heteroskedasticity Test: ARCH

Heteroskedasticity Test: ARCH

F-statistic	0.203311	Prob. F(1,92)	0.7532
Obs*R-squared	0.207406	Prob. Chi-Square(1)	0.5588

Test Equation:

Dependent Variable: RESID^2
Method: Least Squares
Date: 02/02/19 Time: 11:36
Sample (adjusted): 2 105
Included observations: 100 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.123758	1.562852	2.638610	0.0098
RESID^2(-1)	0.047743	0.105883	0.450900	0.6532

R-squared	0.002279	Mean dependent var	4.338685
Adjusted R-squared	-0.008931	S.D. dependent var	14.13534
S.E. of regression	14.19832	Akaike info criterion	8.165858
Sum squared resid	17941.72	Schwarz criterion	8.221042
Log likelihood	-369.5465	Hannan-Quinn criter.	8.188121
F-statistic	0.203311	Durbin-Watson stat	2.032236
Prob(F-statistic)	0.653158		

Appendix –II: Tests for the autocorrelation: Breusch-Godfrey

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.514146	Prob. F(2,89)	0.0770
Obs*R-squared	5.309093	Prob. Chi-Square(2)	0.0603

Test Equation:
Dependent Variable: RESID
Method: Least Squares

Date: 02/02/19 Time: 11:35
Sample: 1 108
Included observations: 105
Pre sample and interior missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NIM	0.011097	0.103078	0.107655	0.9145
LTD	0.003002	0.018790	0.159743	0.8735
LLP	0.005479	0.081547	0.067187	0.9466
CAR	0.000855	0.054043	0.015828	0.9874
ROE	0.002921	0.021403	0.136461	0.8918
GDP	-0.091849	0.234166	-0.392238	0.6959
UM	-0.008742	0.056137	-0.155729	0.8766
C	0.738050	2.621969	0.281487	0.7790
RESID(-1)	0.248516	0.111732	2.224217	0.0288
RESID(-2)	-0.082681	0.110415	-0.748818	0.4561

R-squared	0.056480	Mean dependent var	2.82E-17
Adjusted R-squared	-0.044612	S.D. dependent var	2.104097
S.E. of regression	2.150518	Akaike info criterion	4.469583
Sum squared resid	388.4773	Schwarz criterion	4.740146
Log likelihood	-200.0704	Hannan-Quinn criter.	4.578871
F-statistic	0.558699	Durbin-Watson stat	1.985207
Prob(F-statistic)	0.826934		

Appendix –III: Tests for multicollinearity: correlation matrix

	NIM	LTD	LLP	CAR	ROE	EXR	GDP	UM	LR	INFLN
NIM	1.000000									
LTD	0.699276	1.000000								
LLP	0.791130	0.699276	1.000000							
CAR	-0.535725	-0.646114	0.043919	1.000000						
ROE	-0.059497	-0.152689	0.234712	0.347749	1.000000					
EXR	0.971652	0.950539	0.762449	-0.521881	-0.063092	1.000000				
GDP	-0.822008	-0.795187	-0.789231	0.361867	-0.215071	-0.770628	1.000000			

UM	-0.546114	0.884117	0.739199	-0.484785	0.165317	0.934092	-0.850850	1.000000		
LR	0.984446	-0.091145	0.267616	0.429966	0.317020	0.013166	0.093566	-0.007286	1.000000	
INFL	0.913903	0.884117	0.739199	-0.484785	0.165317	0.934092	-0.850850	-0.521881	-0.063092	1.000000

Appendix –IV: Tests for Model Specification: Ramsey Reset Tests

Ramsey RESET Test
Equation: UNTITLED
Specification: NPL NIM LTD LLP CAR ROE GDP UM C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.386257	85	0.6503
F-statistic	0.149195	(1, 85)	0.6503
Likelihood ratio	0.164847	1	0.6847

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.721419	1	0.721419

Restricted SSR	411.7317	86	4.787578
Unrestricted SSR	411.0103	85	4.835416

LR test summary:

	Value	df
Restricted LogL	-202.8029	86
Unrestricted LogL	-202.7204	85

Unrestricted Test Equation:
Dependent Variable: NPL
Method: Least Squares
Date: 06/07/18 Time: 11:37
Sample: 1 108
Included observations: 105

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NIM	-0.065904	0.104864	-0.628472	0.5314
LTD	0.045584	0.019642	2.320705	0.0227
LLP	0.788189	0.259381	3.038731	0.0032
CAR	-0.152906	0.056626	-2.700288	0.0084
ROE	-0.043199	0.022178	-1.947864	0.0547
GDP	0.245459	0.236558	1.037626	0.3024
UM	0.063265	0.057316	1.103795	0.2728
C	-1.407114	2.749707	-0.511732	0.6102
FITTED^2	0.006042	0.015642	0.386257	0.7003

R-squared	0.663526	Mean dependent var	4.476492
Adjusted R-squared	0.631858	S.D. dependent var	3.624175
S.E. of regression	2.198958	Akaike info criterion	4.504690
Sum squared resid	411.0103	Schwarz criterion	4.748197
Log likelihood	-202.7204	Hannan-Quinn criter.	4.603049
F-statistic	20.95248	Durbin-Watson stat	1.548761
Prob(F-statistic)	0.000000		

Appendix – VI: Tests for Model Selection (Random Effect versus Fixed Effect Models):

Hausman specification test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	2.867535	5	0.8304

Period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
NIM	-0.052616	-0.065676	0.000780	0.6401
LTD	0.018884	0.047285	0.000480	0.1951
LLP	0.800281	0.883077	0.003063	0.1347
CAR	-0.136643	-0.157864	0.000411	0.2949
ROE	-0.041029	-0.044720	0.000133	0.7486

Period random effects test equation:
Dependent Variable: NPL
Method: Panel Least Squares
Date: 06/07/18 Time: 11:34
Sample: 2006 -2017
Periods included: 12
Cross-sections included: 9
Total panel (unbalanced) observations: 105

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.648037	2.348005	1.553675	0.1243
NIM	-0.052616	0.109885	-0.478834	0.6334
LTD	0.018884	0.029272	0.645132	0.5207
LLP	0.800281	0.100901	7.931327	0.0000
CAR	-0.136643	0.059453	-2.298338	0.0242
ROE	-0.041029	0.024938	-1.645247	0.1039
GDP	0.491104	0.710740	0.690976	0.4916
UM	0.037503	0.125806	0.298101	0.7664

Effects Specification

Period fixed (dummy variables)

R-squared	0.682863	Mean dependent var	4.476492
Adjusted R-squared	0.621875	S.D. dependent var	3.624175
S.E. of regression	2.228573	Akaike info criterion	4.594439
Sum squared resid	387.3898	Schwarz criterion	5.027340
Log likelihood	-199.9386	Hannan-Quinn criter.	4.769300
F-statistic	11.19670	Durbin-Watson stat	1.567258
Prob(F-statistic)	0.000000		

Appendix – VII: Descriptive Analysis of dependent and independent variables

	NPL	LTD	NIM	CAR	LLP	GDP	ROE	UM	INFL	EXR
Mean	4.489378	62.80124	5.081591	13.16478	3.505086	10.31875	27.32524	16.44271	0.10900	0.01010
Median	3.360000	59.40000	4.690000	12.17386	2.595168	10.40000	25.68294	17.10000	0.08900	0.08800
Maximum	22.45000	129.6000	13.00000	54.46429	21.46871	11.80000	77.70970	20.40000	0.3640	0.0165
Minimum	0.170000	30.00000	0.500000	4.200000	0.787402	8.000000	-20.20195	4.500000	-0.0106	0.0830
Std. Dev.	3.601867	15.30111	2.385576	5.936848	3.017910	1.113866	15.00128	4.013208	0.1170	0.024
Obser.	105	105	105	105	105	105	105	105	105	105

Appendix – VIII: Regression Results

Dependent
Variable:
NPL
Method:

Panel EGLS (Period random effects)
Date: 06/07/18
Time: 11:33
Sample: 2006 2017
Periods included: 12
Cross-sections included: 9
Total panel (unbalanced) observations: 105
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NIM	-0.065676	0.106275	-0.617980	0.5382
LTD	0.067285	0.019401	2.437296	0.0269
LLP	0.533077	0.084367	10.46713	0.0000
CAR	-0.123864	0.055894	-2.824343	0.0059
ROE	-0.034720	0.022119	-2.021767	0.0363
GDP	-0.253075	0.238909	1.059293	0.1424
UM	0.064983	0.057913	1.122089	0.2649
C	-1.676830	2.695384	-0.622112	0.5355

Effects Specification		
	S.D.	Rho
Period random	0.000000	0.0000
Idiosyncratic random	2.228573	1.0000

Weighted Statistics

R-squared	0.682935	Mean dependent var	4.376492
Adjusted R-squared	0.645500	S.D. dependent var	3.524175
S.E. of regression	2.188054	Sum squared resid	421.7317
F-statistic	22.16342	Durbin-Watson stat	1.696299
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.662935	Mean dependent var	4.476492
Sum squared resid	411.7317	Durbin-Watson stat	1.596299

Appendix VIIII: Summary of All Banks Loans and Advances and NPL in all type of loan (in millions of birr) from 2000-2015

No.	Name of banks	Type of loan	Average loan granted	Non performed loan	NPL %
1	Awash International Bank	Agricultural production term loan	13,048	1565.76	0.12
		Manufacturing production	18,719	3930.99	0.21
		Building & construction term loans	15,316	2910.04	0.19
		Merchandise	6,241	748.92	0.12
		Others	3,405	374.55	0.11
2	Dashen Bank	Agricultural production term loan	16,682	2168.66	0.13
		Manufacturing production	23,934	5504.82	0.23
		Building & construction term loans	19,582	4112.22	0.21
		Merchandise	7980	1436.4	0.18
		Others	4348	565.24	0.13
3	Bank of Abyssinia	Agricultural production term loan	9582	1533.12	0.16
		Manufacturing production	13,746	3024.12	0.22
		Building & construction term loans	11,247	2474.34	0.22
		Merchandise	4584	687.6	0.15
		Others	2491	274.01	0.11
4	Wegagen	Agricultural production term loan	8631	1380.96	0.16

	Bank	Manufacturing production	12,382	2476.4	0.2
		Building & construction term loans	10,130	1620.8	0.16
		Merchandise	4129	536.77	0.13
		Others	2245	246.95	0.11
5	United Bank	Agricultural production term loan	8288	911.68	0.11
		Manufacturing production	11,891	2259.29	0.19
		Building & construction term loans	9729	1264.77	0.13
		Merchandise	3966	515.58	0.13
		Others	2171	303.94	0.14
6	Nib International Bank	Agricultural production term loan	8832	1501.44	0.17
		Manufacturing production	12,670	2660.7	0.21
		Building & construction term loans	10,367	2177.07	0.21
		Merchandise	4225	760.5	0.18
		Others	2304	276.48	0.12
	Total		282,865	14,840	

Source: Messay (2017)